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SECTION 01012

DESIGN AFTER AWARD

PART 1   GENERAL

1.1   GENERAL REQUIREMENTS

1.1.1   Proposed Design Submittals

The Contractor shall propose a schedule for the number and composition of the design submittal phases. As a minimum, design submittals are required at pre-final (90%), final (100%), and backcheck completion. The requirements of each design stage are listed hereinafter. The Contractor shall reflect the number and schedules for the design submittals phases in the progress charts.

1.2   DESIGNER OF RECORD

The Contractor shall identify a Designer of Record ("DOR") for each area of design. All design disciplines shall be accounted for by listed, registered Designer(s) of Record. Each DOR shall be responsible for ensuring integrity of their design and design integration in all construction submittals and extensions to design developed by others, such as the constructor, subcontractors or suppliers. The DOR shall review and approve all construction submittals and extensions to design, in accordance with the procedures, described in Section 01330 SUBMITTAL PROCEDURES. Each DOR shall be responsible for the responses to "Requests for Information" (RFl's), applicable to their area of design responsibility. Each DOR shall stamp, sign, and date all design drawings under their responsible discipline at each design submittal stage (see Contract clause - "REGISTRATION OF DESIGNERS") and all submittals under their responsible discipline, in accordance with the submittal review procedures. The DOR shall sign-off on all applicable RFI responses. "

1.2.1   Electrical Design

Experience in electrical design should include an electrical engineer with the following relevant qualifications or experience:

a. Minimum of seven (7) continuous years of registered professional experience.

b. Demonstrate experience in the design of 15 kV class substations, including metal clad switchgear and relaying.

c. Demonstrate experience in the design of 15 kV class distribution systems, including coordination and short circuit anaylsis.

d. Demonstrate experience in direct coordination with the Engineering and Inspection departments of Hawaiian Electric Company (HECO). Experience should demonstrate the level of familiarity of the engineer with HECO design standards, policies, procedures, personnel, and inspection.

Include as relevant experience a written synopsis of how the engineer plans to coordinate with HECO, complete the design, and obtain approval signatures on the completed drawings. Of interest is to see how the engineer's familiarity with HECO procedures will aid in expediting the design and approval process.

e. Include the name and version of engineering analysis software the engineer is planning on using to perform the protective device coordination and short circuit analyses.

1.3 DEFINITION OF DESIGN SUBMITTALS

1.3.1 PRE-FINAL REVIEW SUBMITTAL (90%)

The review of this submittal is to insure that the design is in accordance with directions provided the Contractor during the design process as well as the original solicitation and the Contractor's proposal. The Contractor shall submit the following documents for Pre-final Design Review:

1.3.1.1 Design Analysis

All design calculations shall be included. The Design Analysis shall contain all explanatory material giving the design rationale for any design decisions, which would not be obvious to an engineer reviewing the Final Drawings and Specifications. Design Analysis shall comply with the requirements of ER 1110-345-700 Design Analysis, Drawings and Specifications, 30 May 97.

1.3.1.2 Drawings

The Contract Drawings submitted for pre-final Design Review shall include the Graphic Exhibits provided in the Statement of Work that has been revised and completed as necessary. The Contractor is expected to have completed all of his coordination checks and have the drawings in a design complete condition. The drawings shall contain all the details necessary to assure a clear understanding of the work throughout construction. Shop drawings will not be considered as design drawings. All design shall be shown on design drawings prior to submittal of shop drawings.

1.3.1.3 Specifications

The Draft Specifications on all items of work submitted for pre-final Design Review shall consist of legible marked-up specification sections.

1.3.1.4 Environmental Permits

Environmental permits, as required. When environmental permits are not required, the Contractor shall provide a statement with justification to that effect.

1.3.2 FINAL DESIGN SUBMITTAL (100%)

The review of this submittal is to insure that the design is in accordance with directions provided the Contractor during the design process as well as the 90% submittal. The Contractor shall submit the following documents for Final Design Review:

a. Design Analysis, in final 100% complete form

b. 100% complete Drawings

c. 100% typed Specifications

d. Pre-final Design (90%) Submittal review comments and responses.

1.3.3 Backcheck Submittal

After the 100% Design Review, the Contractor shall revise the Contract Document by incorporating any comments generated during the 100% Design Review and shall prepare final hard copy Contract Drawings and Specifications. The Contractor shall submit the following documents for the Backcheck submittal:

a. Design Analysis, in final 100% complete form

b. 100% complete drawings.

c. Final specifications.

d. 100% Review comments and responses.

(a second backcheck submittal will be made if all of the comments were not satisfactory resolved in the 1st Backcheck submittal as determined by the Contracting Officer). Note that additional backchecks will be required until all of the comments have been satisfactorily resolved.

e. Electronic Submission: All CADD files in AutoDesk AutoCAD Version 2000 or latest format, as well as all prepared technical specifications shall be provided on separate CD-ROM. The CADD files shall be compliant with A/E/C CADD Standards Release 2.0. This standard can be downloaded from the CADD/GIS Technology Center at http://tsc.wes.army.mil/products/standards/aec/aecstdweb.asp. Two copies each of the CD-ROM (for drawings and specifications) are required.

1.4 QUANTITY OF DESIGN SUBMITTALS

1.4.1 General

The documents, which the Contractor shall submit to the Government for each submittal, are listed and generally described hereinafter.

DISTRIBUTION

Activity & Address	Drawings Full/Half	Specs.	Design Analysis Report	Elec. PDF CD ROM	Color Boards
Attn: Mr. Bernie Marcos HQ PACAF/CECC 25 'E' Street Building 1102, Suite D-325 Hickam AFB, Hawaii 96853-5412	0/1	0	1	1	0
Attn: CPT Joshua Biggers 15th CES/CECI 75 'H' Street	3/2	1	1	8	0

DISTRIBUTION

Activity & Address	Drawings Full/Half	Specs.	Design Analysis Report	Elec. PDF CD ROM	Color Boards
Building 1200 Hickam AFB, Hawaii 96853					
Attn: Mr. Roy Sakaguchi 15th CS/SCX 25 'E' Street Building 1102, Suite L-203 Hickam AFB, Hawaii 96853-5435	1/0	1	1	1	0
Attn: Mr. Rick Whitman 38 EIG/GP 4064 Hilltop Road Tinker AFB, Oklahoma 73145	0/0	0	0	1	0
Attn: Raymond Kong US Army Corps of Engineers Honolulu District, Technical Support Branch Building 230, Rm. 110, CEPOH-EC-Q Fort Shafter, Hawaii 96858-5440	4/0	4	4	0	0
Attn: Gordon Kuioka US Army Corps of Engineers Honolulu District, Program and Project Management Building 230, Rm. 318, CEPOH-PP-D Fort Shafter, Hawaii 96858-5440	0/1	1	1	1	0
Attn: Robert Inouye US Army Corps of Engineers Honolulu District, Fort Shafter Resident Office Building 230, CEPOH-EC-CF Fort Shafter, Hawaii 96858-5440	1/1	1	1	1	0

1.5 MAILING OF DESIGN SUBMITTALS

1.5.1 General

Mail all design submittals to the Government during design and construction, using an overnight courier service.

1.5.2 Transmittal Letter

Each design submittal shall have a transmittal letter accompanying it indicating the date, design percentage, type of submittal, list of items submitted, transmittal number and point of contact with telephone number.

1.6 COORDINATION

1.6.1 Written Records

The Contractor shall prepare a written record of each design site visit, meeting, or conference, either telephonic or personal, and furnish within five (5) working days copies to the Contracting Officer and all parties involved. The written record shall include subject, names of participants, outline of discussion, and recommendation or conclusions. Number each written record for the particular project under design in consecutive order.

1.6.2 Design Needs List

Throughout the life of his contract the Contractor shall furnish the Contracting Officer's Representative a monthly "needs" list for design related items. This list shall itemize in an orderly fashion design data required by the Contractor to advance the design in a timely manner. Each list shall include a sequence number, description of action item, name of the individual or agency responsible for satisfying the action item and remarks. The list will be maintained on a continuous basis with satisfied action items checked off and new action items added as required. Once a request for information is initiated, that item shall remain on the list until the requested information has been furnished or otherwise resolved. Copies of the list will be mailed to both the Administrative Contracting Officer and the agencies tasked with supplying the information.

1.7 GOVERNMENT REVIEW

1.7.1 Design Schedule

Within 30 days after Notice to Proceed, the Contractor shall submit, for approval, a complete design schedule with all submittals and review times indicated in calendar dates. The Contractor shall update this schedule monthly. No design submittals will be reviewed or evaluated until after receipt and acceptance of the proposed design/review schedule.

1.7.2 Government Review Period

After receipt, the Government will be allowed thirty (30) calendar days to review and comment on each design submittal. The review will be for conformance with the technical requirements of the solicitation and the Successful Offeror's (Contractor's) RFP proposal. If the Contractor disagrees technically with any comment or comments and does not intend to comply with the comment, he must clearly outline, with ample justification, the reasons for noncompliance within seven (7) calendar days after receipt of these comments in order that the comment can be resolved. The Contractor shall provide and respond to all comments in DrChecks. The Contractor is cautioned in that if he believes the action required by any comment exceeds the requirements of this contract, that he should take no action and notify the Contracting Officer's Representative in writing immediately. Review conferences will be held for each design submittal at a location to be furnished by the Contractor. The Contractor shall bring the personnel that developed the design submittal to the review conference. These conferences will take place the week after the receipt of the comments by the Contractor.

1.7.3 All documents submitted will be reviewed by the Government

Review comments will be issued to the DOR, indicating changes or other action required. All revisions shall be incorporated into the documents as required by review comments unless adequate justification is furnished to the Government indicating reason such actions or changes constitutes a change in the scope of work of this task order.

1.7.4 All Review Comments Shall Be Resolved and Annotated

All review comments shall be resolved and annotated with the intended actions by the DOR. In cases of unsatisfactory compliance or resolution of comments, design documents will be returned to the DOR for correction.

1.7.5 Dr. Checks

After award of the contract, the DOR shall contact Resource Center Enterprises (1-800-428-4357) to register their firm and all sub-consultants in DrChecks (electronic government review system). Each firm will receive a registration key. Once the key is received, any individual from that firm will able to register onto ProjNet and get into DrChecks. The DOR will be responsible for accessing DrChecks to obtain review comments and provide annotated responses for this project at www.projnet.org. The DOR shall check and incorporate any applicable Honolulu District Design Quality Lessons learned (DQLL) into the design of this project.

1.7.6 Post review conference action

Copies of comments, annotated with comment action agreed on, will be made available to all parties before the conference adjourns. Unresolved problems will be resolved by immediate follow-on action at the end of conferences. Valid comments will be incorporated. After receipt of final (100%) corrected building design documents upon incorporation of backcheck comments the contractor may proceed with site and building development activities within the parameters set forth in the contract and accepted design submittal. The Government, however, reserves the right to disapprove design document submittals if comments are significant (in the opinion of the Government, it does not comply with the contract documents nor the level of quality implied). If pre-final or final submittal(s) are incomplete or deficient, and require correction by the Contractor and re-submittal for review, the cost of rehandling and reviewing will be deducted from payment due the Contractor at the rate of $ 5,000.00 per submittal.

1.8 HAWAIIAN ELECTRIC COMPANY (HECO) REVIEW

HECO shall review and approve all plans and specifications pertaining to work affecting HECO structures. See the electrical statement of work in this package for additional details.

1.9 DESIGN ANALYSIS

1.9.1 Media and Format

Present the design analysis on 8-1/2-inch by 11-inch paper except that larger sheets may be used when required for graphs or other special calculation forms. All sheets shall be in reproducible form. The material may be typewritten, hand lettered, handwritten, or a combination thereof, provided it is legible. Side margins shall be 1-inch minimum to permit side binding and head to head printing. Bottom margins shall be 1-1/4-inches, with page numbers centered 1 inch from the bottom. In addition, Design Analysis must also be submitted in electronic Adobe PDF format as described in Design Submittals.

1.9.2 Organization

Assign the several parts and sheets of the design analysis a sequential binding number and bind them under a cover indicating the name of the facility and project number, if applicable. The title page shall carry the designation of the submittal being made. The complete design analysis presented for final review with the final drawings and specifications shall carry the designation "FINAL DESIGN ANALYSIS" on the title page.

1.9.3 Design Calculations

Design calculations are a part of the design analysis. When they are voluminous, bind them separately from the narrative part of the design analysis. Present the design calculations in a clean and legible form incorporating a title page and index for each volume. Furnish a table of contents, which shall be an index of the indices, when there is more than one volume. Identify the source of loading conditions, supplementary sketches, graphs, formulae, and references. Explain all assumptions and conclusions. Calculation sheets shall carry the names or initials of the author and the checker and the dates of calculations and checking. No portion of the calculations shall be computed and checked by the same person.

1.9.4 Automatic Data Processing Systems (ADPS)

When ADPS are used to perform design calculations, the design analysis shall include descriptions of the computer programs used and copies of the ADPS input data and output summaries. When the computer output is large, it may be divided into volumes at logical division points. Precede each set of computer printouts by an index and by a description of the computation performed. If several sets of computations are submitted, a general table of contents in addition to the individual indices shall accompany them. Preparation of the description, which must accompany each set of ADPS printouts, shall include the following:

1. Explain the design method, including assumptions, theories, and formulae.

2. Include applicable diagrams, adequately identified.

3. State exactly the computation performed by the computer.

4. Provide all necessary explanations of the computer printout format, symbols, and abbreviations.

5. Use adequate and consistent notation.

6. Provide sufficient information to permit manual checks of the results.

1.9.5 Power System Coordination Study

Submit the Power System Coordination Study in paragraph 5-12, Chapter 5 - Electrical Systems as part of the Design Analysis.

1.10 DRAWINGS

1.10.1 General

Prepare all drawings on Computer-Aided Design and Drafting (CADD) so that they are well-arranged and placed for ready reference and so that they present complete information. The Contractor shall prepare the drawings with the expectation that the Corps of Engineers, in the role of supervision, will be able to construct the facility without any additional assistance from the Contractor. Drawings shall be complete, unnecessary work such as duplicate views, notes and lettering, and repetition of details shall not be permitted. Do not show standard details not applicable to the project, and minimize unnecessary wasted space. Do not include details of standard products or items, which are adequately covered by specifications on the drawings. Each Design Discipline shall provide a complete list of abbreviations and symbols used in their respective drawings. Detail the drawings such that conformance with the RFP can be checked and to the extent that shop drawings can be checked. Do not use shop drawings as design drawings. The design documents shall consist of drawings on a 863.6 mm x 558.8 mm or 22.0" x 34.0 " format. The Contractor shall use standard Corps of Engineers title blocks and borders on all drawings. Submit an index of drawings with each submittal. The Contracting Officer's Representative will furnish the Contractor file, drawing, and specification numbers for inclusion in the title blocks of the drawings. In addition, Drawings must be submitted in electronic Adobe PDF format as described in Design Submittals.

1.10.2 Methods and Format

Create all drawings using CADD methods in AutoCAD format. Save all Design Complete CADD files as AutoDesk AutoCAD Version 2000 or later. The Contractor shall be compliant with A/E/C CADD Standards Release 2.0. This standard can be downloaded from the CADD/GIS Technology Center at http://tsc.wes.army.mil/products/standards/aec/aecstdweb.asp This standard shall be used as guidance for standard details, cell libraries, title blocks, and layer/level assignments.

1.10.3 Use of Standard Fonts

Only standard fonts provided by AutoCAD shall be used in the creation of CADD files. No fonts created by third parties or the designers are permitted.

1.10.4 Use of Reference Files

The use of Reference files and Xrefs during the design stage are up to the discretion of the designers. Separate model and sheet files shall be provided as required by A/E/C CADD Standards Release 2.0.

1.10.5 Submittal Media

Submit five (5) copies of all Design Complete CADD files on the following media.

- CD-ROM Disk

1.11 SPECIFICATIONS

1.11.1 General

The Contractor shall submit marked-up and final specifications as required. The specifications shall be Unified Facilities Guide Specifications (UFGS). Edit the specifications for this project and submit in marked-up or redlined draft version at the Pre-Final Review submittal stage. If the design is based on a specific product, the specification shall consist of the important features of the product. The specification shall be detailed enough such that another product meeting the specification could be substituted and it would not adversely impact the project. After incorporation of comments, submit a final, design complete specification package. Delete all marked-out or redlined text and type in all inserted text. In addition, Specifications must be submitted in Adobe PDF format as described in Design Submittals.

1.11.2 Submittal Register

Develop the submittal requirements during construction during the design phase of the contract, by producing a Contractor Submittal Register during design. The Contractor shall be responsible for listing all required submittals necessary to insure the project requirements are complied with. The Register shall identify submittal items such as shop drawings, manufacturer's literature, certificates of compliance, material samples, guarantees, test results, etc that the Contractor shall submit for review and/or approval action during the life of the construction contract. The Contractor shall place all the Submittal Register pages in an appendix of the final specifications.

1.12 CONTENTS OF 90% DESIGN SUBMITTAL

1.12.1 90% Pre-Final Design Submittal

The review of this submittal is to ensure that the design is in accordance with the directions provided the Contractor during the design process as well as the original solicitation and the contractor's proposal. The Contractor shall submit the following documents for 90% Design Review:

1.12.1.1 Design Analysis

All design calculations shall be included. The Design Analysis shall contain all explanatory material given the design rationale for any design decisions, which would not be obvious to an engineer reviewing the submitted Drawings and Specifications.

1.12.1.2 Contract Drawings

The Contract Drawings submitted for 90% Design Review shall include the Graphic Exhibits provided in the Statement of Work that has been revised and completed as necessary. The Contractor is required to have properly completed his coordination checks and have the drawings 90% complete. The drawings shall contain sufficient detail necessary to assure a clear understanding of the intent of the work. Shop drawings will not be considered as design drawings.

1.12.1.3 Specifications

The specifications for all items of work submitted for 90% review shall consist of legible mark-up specifications sections.

1.12.2 Electronic Submission

Appropriate number of copies of CD ROM containing Adobe PDF file formats of the Pre-Final 90% Drawings, Design Analysis and Specifications shall also be submitted, in addition to required hard copies.

1.12.3 General Narratives -Site/Utility Portion at 90% Design Submittal

The site/utility portion of the 90% design submittal shall contain as a minimum, the following:

a. Site/Layout: Explanation of objectives and factors influencing siting decisions. General overview of major site features planned, such as building orientation, drainage patterns, parking provisions, traffic circulation, provisions for the handicapped, security requirements, etc. Rationale for locating major site elements. Set back requirements or specific clearance requirements. Locations of borrow and spoil areas.

b. Utility Systems: Design narrative for the electrical systems relating to this project. Include an analysis of the existing distribution systems capability to supply sufficient quantity at adequate levels. If the existing distribution systems are inadequate, provide the design solution to augment the systems to provide the requirements for the new facilities.

1.12.3.1 Drawings, Required Technical Data Developed to 90% Completion

All drawings included in the required technical data for the proposal submission, shall be developed to 90 percent completion. In addition to the individual utility plans, submit a combined utility plan drawn to the same scale as the individual utility plans.

a. General Site Layout: Site plan showing the location of the project buildings in relation to other existing buildings, roads, electrical poles, exterior power lines. Label and tie down locations of new site elements (buildings, manholes, handholes, pullboxes, power poles, street lighting, etc.) Scale shall be included.

b. Electrical Plan Requirements: Required diagrams and details on Site Electrical and Telecommunications Drawings.

(1) Off-Site Electrical and Telecommunications Distribution Plans:

(2) Off-Site Primary Circuit Routing Plans:

(3) Off-Site One Line Diagrams

(4) Off-Site Details.

(5) On-Site Electrical and Telecommunications Distribution Plans:

(6) On-Site One Line Diagrams

(7) On-Site Distribution Transformer Schedule: Provide with the following headings:

(8) Transformer Designation. Transformer Size (KVA). Building(s) Served. Primary Phase(s) and Circuit to which connected.

(9) Details shall include but not limited to poles, manholes, handholes, ductbanks, site lighting poles, trenching, pad-mounted transformers and switches, etc. Calculations shall support all new manhole and handhole locations.

(10) See Chapter 5, Electrical Systems, for other design requirements.

c. Specifications: Provide pre-final draft marked-up specifications, which include all sections, which apply to site/utility work.

d. Design Analysis: Design analysis shall include design calculations fully developed to support the design of the site and utility systems included in this submittal.

e. Geotechnical: Soils analysis and geotechnical report. Geotechnical information must be provided to support all assumptions and design parameters utilized in the presented site/utility design as applicable.

1.12.4 Building Portion at 90% Design Submittal

The building portion of the 90% design submittal shall contain as a minimum, the following:

1.12.4.1 Architectural

a. The complete architectural analysis, drawings and specifications shall be included in the 90% Pre-Final Submittal. Architectural specifications must be complete with all edits incorporated in the specification text.

b. Details: Complete Construction details, sections, interior elevations, exterior elevations, etc., shall be provided to describe the methods and materials of design.

c. Fire rated construction plan: All fire rated walls shall be shown where they begin and where they end. Fire rated doors, fire rated door frames, fire rated windows and window frames, door hardware, fire dampers, and smoke dampers are to be shown with the appropriate fire rating in hours.

1.12.4.2 Structural Systems

a. State the live loads to be used for design. Include roof and floor loads; wind loads, lateral earth pressure loads, seismic loads, etc., as applicable.

b. Describe the method of providing lateral stability for the structural system to meet seismic and wind load requirements. Include sufficient calculations to verify the adequacy of the method.

c. Furnish calculations for all principal roof, floor, and foundation members.

d. This submittal shall include drawings showing roof and floor framing plans as applicable. Principal members will be shown on the plans. A foundation plan shall also be furnished showing main footings and grade beams where applicable. Where beam, column, and footing schedules are used, show schedules and fill in sufficient items to indicate method to be used. Show typical bar bending diagram if applicable. Typical sections shall be furnished for roof, floor, and foundation conditions. Structural drawings for proposals and submittals shall be separate from architectural drawings.

e. Any computer analyses used shall be widely accepted, commercially available programs; or complete documentation of the input and output of the program shall be provided.

f. Provide complete seismic analyses for all building structural components. Seismic calculations shall clearly demonstrate compliance with all requirements set forth in the Statement of Work.

1.12.4.3 Electrical Systems Requirements

The Electrical systems design analysis, drawings, and specifications shall contain as a minimum, the following:

a. Electrical Floor Plans. The floor plans shall show all principle architectural features of the building, which will affect the electrical design. The floor plans shall also show (but not limited to) the following:

Room designations.
Electrical legend and applicable notes.
Lighting fixtures, properly identified.
Switches for control of lighting.
Receptacles.

Location and designation of panel boards. Plans should clearly indicate type of mounting required (flush or surface) and be reflected accordingly in specifications. Service entrance (conduit and main disconnect).

Location, designation and rating of motors and/or equipment which requires electrical service. Show method of termination and/or connection to motors and/or equipment. Show necessary junction boxes, disconnects, controllers (approximate only), conduit stubs, and receptacles required to serve the motor and/or equipment. All circuit wiring and cables (number and sizes)

All conduit runs and sizes
All riser and one line diagrams
All other electrical and electronic equipment

c. Building Riser Diagram (from pad-mounted transformer to unit load center panel board): Indicate the types and sizes of electrical equipment and wiring. Include grounding and metering requirements.

d. Load Center and Panelboard Schedule(s): Schedule shall indicate the following information:

Load Center/Panelboard Characteristics (Panel Designation, Voltage, Phase, Wires, Main Breaker Rating and Mounting)
Branch Circuit Designations.
Load Designations.
Circuit Breaker Characteristics. (Number of Poles, Trip Rating, AIC Rating)
Branch Circuit Connected Loads (AMPS).

Special Features.

e. Lighting Fixture Schedule: (Schedule shall indicate the following information:)

Fixture Designation.
General Fixture Description.
Number and Type of Lamp(s).
Type of Mounting.
Voltage
Special Features.

f. Details: Details of all light fixtures shall be provided. Construction details, sections, elevations, etc., shall be provided where required for clarification of methods and materials of design.

g. Electrical systems specifications must be complete with all mark-ups and edits incorporated in the specification text.

h. Design analysis and calculations for the electrical systems shall be prepared by a licensed professional engineer and data shall be stamped. The design analysis shall be separately bound, in one or more volumes. The design analysis shall include all calculations required to support design decisions, including (but not limited to) lighting calculations, voltage drop calculations, load calculations (for transformers, conductor sizes, circuit breaker sizes, panelboard sizes, etc.), and protective device coordination short circuit calculations. The analysis shall also include specific criteria furnished, conference minutes, and cost analyses of all systems considered. Show functional and engineering criteria, design information, and calculations applicable to the project. The analysis shall be organized in a format appropriate for review, approval, and record purposes. The design calculations shall indicate methods and references identified, and shall explain assumptions and conclusions.

i. Voltage Drop (VD) Calculations: Provide voltage drop calculations of primary feeders, site lighting circuits, service laterals, feeder conductors, and selected branch circuits over 31m (100 ft) in length. Maximum allowable voltage drop for site lighting and service laterals is 3%. The combined voltage drop for the service laterals, unit feeders, and branch circuit cannot exceed 5 percent.

j. Means of egress lighting and LED type exit signs meeting LSC shall be shown on the plans.

k. See Chapter 5, Electrical Systems, for other design requirements.

1.12.4.4 Sustainable Design:

Provide a completed SPiRiT checklist to show compliance with the Bronze level indicated in the Statement Of Work and incorporated comments on the previous design submittal.

1.13 CONTENTS OF 100% DESIGN SUBMITTAL

1.13.1 General:

A complete set of construction documents plans and specifications at the same level of detail as if the project were to be bid including a complete list of equipment, fixtures and materials to be used.

1.13.1.1 Complete Design Analysis for All Design Disciplines

The Final 100% Design Analysis shall be an extension of the reviewed 90% design analysis and supports and verifies the design complies with the requirements of the project.

1.13.1.2 Final (100%) Drawings

The Final (100%) drawings are an extension of the review 90% drawings and include all revisions incorporated from the 90% review comments. Drawings shall be 100% complete, signed and sealed by the designer of record.

1.13.1.3 Final (100%) Specifications

The Contractor shall make final identification of all materials at this stage.

1.13.1.4 Electronic Submission

Appropriate number of copies of CD ROM containing Adobe PDF file formats of the Final 100% Drawings, Design Analysis and Specifications shall also be submitted, in addition to required hard copies.

1.13.1.5 Comment Response Package:

Complete package showing all comments from all previous reviews and the respective response and disposition.

1.13.1.6 Additional Requirements.

a. Compliance Certification

(1) The Contractor shall certify that the features and standards offered in its submittals meet or exceed the corresponding mandatory features and standards stated in the Scope of Work. A certification to this effect shall be included on the title sheet of each submittal made under this section. The certification shall be signed by the person(s) authorized to bind the offeror under the offer, or by persons who have been delegated, in writing such authorization.

(2) The parties understand that, at the time of award, all features and standards proposed in the Contractor's accepted offer, including the mandatory requirements of the RFP, as amended by the Contractor's accepted offer, become binding upon both the Government and the Contractor. Deviations from the features and standards of the accepted offer, including deviations from the RFP's mandatory requirements, as amended by the accepted offer, may be approved by the Contracting Officer upon written application by the Contractor and agreement as to good and sufficient consideration by the parties, reflected in an equitable

adjustment to the contract price.

b. Field Inspection. The Contractor shall verify field conditions, which are significant to design, by field inspection, researching and obtaining all necessary as-built drawings and reproducing them for his own use as necessary, and discussing status with knowledgeable personnel. The information shall be reflected in the design documents.

c. Additional Topographic Information. The Government has supplied all or a majority of the topographic information required for the project as part of the topographic survey sheets provided in the Request for Proposals drawings. Any additional topographic information required by the Contractor for design after award of the contract shall be procured and paid for by the successful Proposer.

d. Soil and Foundation Report. A final and complete soil and foundation report shall be furnished by the Contractor in accordance with the Statement of Work.

1.13.2 Building Portion at 100 Percent Design Submittal

The building design portion of the 100% design submittal shall contain, as a minimum, the following items for all submittals:

1.13.2.1 Architectural

The architectural analysis, drawings and specifications shall include the 90% submittal with corrections incorporated including the annotated comments indicating what corrections were done. Architectural specifications must be complete with all edits incorporated in the specification text.

All architectural drawings shall be coordinated with the other engineering disciplines. Ensure that the plans are in compliance with the applicable codes. It will be the Contractor's responsibility to implement the comments generated from any design review submittal as well as verify the consistency between plans and specification. The evaluation of the Contractor's submittals shall be based on degree to which the submittal meet the requirements set forth in this document and the specifications.

1.13.2.2 Structural Design

a. Furnish complete checked calculations for all structural members. Incorporate any changes required by comments on 90% Design Submittal.

b. Prior to this submittal, structural drawings shall be coordinated with all other design disciplines.

c. The final structural drawings shall contain the following information as a set of general notes:

The allowable soil bearing value.
The design stresses of structural materials used.
The design live loads used in the design of various portions of the structures.
The design wind speed.

The seismic acceleration coefficients, seismic use group, and performance level criteria used in design.

d. All structural drawings and calculations shall be checked and stamped by the designer of record (a registered Professional Engineer).

1.13.2.3 Specific Electrical Requirements:

The Electrical systems design analysis, drawings, and specifications shall include the 90% Submittal with corrections incorporated, including the annotated comments indicating what corrections were done on the 100% Submittal. All requirements specified in the 90% Submittal must be developed and completed to this 100% stage.

1.13.2.4 Sustainable Design:

Provide a revised completed SPiRiT checklist to show compliance with the Bronze level of the SpiRiT checklist due to changes in the design from the 90% submittal to the 100% submittal.

1.14 CONTENTS OF BACKCHECK SUBMITTAL

a. Design Drawings: Drawings shall be 100% complete, signed and sealed by the designer of record. All previous review comments shall be incorporated.

b. Design Analysis: Complete final design analysis for all design disciplines.

c. Specifications: Complete specifications shall be coordinated with the drawings and described in detail all items shown on the drawings.

d. Comment Response Package: Complete specifications shall be coordinated with the drawings and described in detail all items shown on the drawings.

PART 2 PRODUCTS

2.1 DESIGN RELATED PRODUCTS

2.1.1 DD Form 1354:

Three (3) sets of DD Form 1354, Transfer and Acceptance of Military Real Property shall be prepared in accordance with ER 415-345-38 and submitted to the Contracting Officer.

2.1.2 Reproduction:

Upon Government approval of 100% design documents, the original will be returned to the Contractor for reproduction purposes. The Contractor will be responsible for his own reproduction as well as reproduction for Government use. The Government will require twice the number of copies of the plans and specifications as were required for the review stages, no color boards will be required. The originals will be retained by the Contractor for recording of as-built conditions. Upon completion of the project, the original design documents corrected to reflect as-built conditions will be supplied to the Government.

PART 3   EXECUTION

(Not Applicable)

-- End of Section --

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DIVISION 01 - GENERAL REQUIREMENTS

SECTION 01312

QUALITY CONTROL SYSTEM (QCS)

SECTION 01312

QUALITY CONTROL SYSTEM (QCS)

PART 1 GENERAL

1.1 GENERAL

The Government will use the Resident Management System for Windows (RMS) to assist in its monitoring and administration of this contract. The Contractor shall use the Government-furnished Construction Contractor Module of RMS, referred to as QCS, to record, maintain, and submit various information throughout the contract period. This joint Government-Contractor use of RMS and QCS will facilitate electronic exchange of information and overall management of the contract. QCS provides the means for the Contractor to input, track, and electronically share information with the Government in the following areas:

Administration
Finances
Quality Control
Submittal Monitoring
Scheduling
Import/Export of Data

1.1.1 Applicability

QCS shall be used during both the design and construction phases of the contract.

1.1.2 Correspondence and Electronic Communications

For ease and speed of communications, both Government and Contractor will, to the maximum extent feasible, exchange correspondence and other documents in electronic format. Correspondence, pay requests and other documents comprising the official contract record shall also be provided in paper format, with signatures and dates where necessary. Paper documents will govern, in the event of discrepancy with the electronic version.

1.1.3 Other Factors

Particular attention is directed to Contract Clause, "Schedules for Construction Contracts", Contract Clause, "Payments", Section 01320, PROJECT SCHEDULE, Section 01330, SUBMITTAL PROCEDURES, and Section 01451, CONTRACTOR QUALITY CONTROL, which have a direct relationship to the reporting to be accomplished through QCS. Also, there is no separate payment for establishing and maintaining the QCS database; all costs associated therewith shall be included in the pricing for the work.

1.2 QCS SOFTWARE

QCS is a Windows-based program that can be run on a stand-alone personal computer or on a network. The Government will make available the QCS software to the Contractor after award of the contract. Prior to the

Pre-Design Conference, the Contractor shall be responsible to download, install and use the latest version of the QCS software from the Government's RMS Internet Website:

(http://winrms.usace.army.mil/contractor's.htm).

Upon specific justification and request by the Contractor, the Government can provide QCS on 3-1/2 inch high-density diskettes or CD-ROM. Any program updates of QCS will be made available to the Contractor via the Government RMS Website as they become available.

1.3 SYSTEM REQUIREMENTS

The following listed hardware and software is the minimum system configuration that the Contractor shall have to run QCS:

HARDWARE

IBM-compatible PC with 200 MHz Pentium or higher processor
32+ MB RAM

4 GB hard drive disk space for sole use by the QCS system

3 1/2 inch high-density floppy drive

Compact disk (CD) Reader

Color monitor

Laser printer compatible with HP LaserJet III or better, with minimum 4 MB installed memory.

Connection to the Internet, minimum 28 BPS

SOFTWARE

MS Windows 95 or newer version operating system (MS Windows NT 4.0 or newer is recommended)

Word Processing software compatible with MS Word 97 or newer

Internet browser

The Contractor's computer system shall be protected by virus protection software that is regularly upgraded with all issued manufacturer's updates throughout the life of the contract.

Electronic mail (E-mail) compatible with MS Outlook

1.4 RELATED INFORMATION

1.4.1 QCS User Guide

After contract award, the Contractor shall download instructions for the installation and use of QCS from the Government RMS Internet Website. In case of justifiable difficulties, the Government will provide the Contractor with a CD-ROM containing these instructions.

1.4.2 Contractor Quality Control (CQC) Training

The use of QCS will be discussed with the Contractor's QC System Manager in the course entitled, "Construction Quality Management For Contractors" (Section 01451 CONTRACTOR QUALITY CONTROL).

1.5 CONTRACT DATABASE

Prior to the pre-design conference, the Government will provide the Contractor with basic contract award data to use for QCS. The Government will provide data updates to the Contractor as needed, generally by files attached to E-mail. These updates will generally consist of submittal reviews, correspondence status, QA comments, and other administrative and QA data.

1.6 DATABASE MAINTENANCE

The Contractor shall establish, maintain, and update data for the contract in the QCS database throughout the duration of the contract. The Contractor shall establish and maintain the QCS database at the Contractor's site office. Data updates to the Government shall be submitted by E-mail with file attachments, e.g., daily reports, schedule updates, payment requests. If permitted by the Contracting Officer, a data diskette or CD-ROM may be used instead of E-mail (see Paragraph DATA SUBMISSION VIA COMPUTER DISKETTE OR CD-ROM). The QCS database typically shall include current data on the following items:

1.6.1 Administration

1.6.1.1 Contractor Information

The database shall contain the Contractor's name, address, telephone numbers, management staff, and other required items. Within 14 calendar days of receipt of QCS software from the Government, the Contractor shall deliver Contractor administrative data in electronic format via E-mail.

1.6.1.2 Subcontractor Information

The database shall contain the name, trade, address, phone numbers, and other required information for all subcontractors. A subcontractor must be listed separately for each trade to be performed. Each subcontractor/trade shall be assigned a unique Responsibility Code, provided in QCS. Within 14 calendar days of receipt of QCS software from the Government, the Contractor shall deliver subcontractor administrative data in electronic format via E-mail.

1.6.1.3 Correspondence

All Contractor correspondence to the Government shall be identified with a serial number. Correspondence initiated by the Contractor's site office shall be prefixed with "S". Letters initiated by the Contractor's home (main) office shall be prefixed with "H". Letters shall be numbered starting from 0001. (e.g., H-0001 or S-0001). The Government's letters to the Contractor will be prefixed with "C".

1.6.1.4 Equipment

The Contractor's QCS database shall contain a current list of equipment planned for use or being used on the jobsite, including the most recent and planned equipment inspection dates.

1.6.1.5 Management Reporting

QCS includes a number of reports that Contractor management can use to track the status of the project. The value of these reports is reflective of the quality of the data input, and is maintained in the various sections of QCS. Among these reports are: Progress Payment Request worksheet, QA/QC comments, Submittal Register Status, Three-Phase Inspection checklists.

1.6.2 Finances

1.6.2.1 Pay Activity Data

The QCS database shall include a list of pay activities that the Contractor shall develop in conjunction with the construction schedule. The sum of all pay activities shall be equal to the total contract amount, including modifications. Pay activities shall be grouped by Contract Line Item Number (CLIN), and the sum of the activities shall equal the amount of each CLIN. The total of all CLINs equals the Contract Amount.

1.6.2.2 Payment Requests

All progress payment requests shall be prepared using QCS. The Contractor shall complete the payment request worksheet and include it with the payment request. The work completed, measured as percent or as specific quantities, shall be updated at least monthly. After the update, the Contractor shall generate a payment request report using QCS. The Contractor shall submit the payment requests with supporting data by E-mail with file attachment(s). If permitted by the Contracting Officer, a data diskette may be used instead of E-mail. A signed paper copy of the approved payment request is also required, which shall govern in the event of discrepancy with the electronic version.

1.6.3 Quality Control (QC)

QCS provides a means to track implementation of the 3-phase QC Control System, prepare daily reports, identify and track deficiencies, document progress of work, and support other contractor QC requirements. The Contractor shall maintain this data on a daily basis. Entered data will automatically output to the QCS generated daily report. The Contractor shall provide the Government a quality control plan within the time required in Section 01451, CONTRACTOR QUALITY CONTROL. Within seven calendar days of Government acceptance, the Contractor shall submit a data diskette or CD-ROM reflecting the information contained in the accepted quality control Plan: schedule, pay activities, features of work, submittal register, QC requirements, and equipment list.

1.6.3.1 Daily Contractor Quality Control (CQC) Reports

QCS includes the means to produce the Daily CQC Report. The Contractor may use other formats to record basic QC data. However, the Daily CQC Report generated by QCS shall be the Contractor's official report. Data from any supplemental reports by the Contractor shall be summarized and consolidated onto the QCS-generated Daily CQC Report. Daily CQC Reports shall be submitted as required by Section 01451, CONTRACTOR QUALITY CONTROL. Reports shall be submitted electronically to the Government using E-mail or diskette within 24 hours after the date covered by the report. Use of either mode of submittal shall be coordinated with the Government representative. The Contractor shall also provide the Government a signed, printed copy of the daily CQC report.

1.6.3.2 Deficiency Tracking

The Contractor shall use QCS to track deficiencies. Deficiencies identified by the Contractor will be numerically tracked using QC punch list items. The Contractor shall maintain a current log of its QC punch list items in the QCS database. The Government will log the deficiencies it has identified using its QA punch list items. The Government's QA punch list items will be included in its export file to the Contractor. The Contractor shall regularly update the correction status of both QC and QA punch list items.

1.6.3.3 Three-Phase Control Meetings

The Contractor shall maintain scheduled and actual dates and times of preparatory and initial control meetings in QCS.

1.6.3.4 Accident/Safety Tracking

The Government will issue safety comments, directions, or guidance whenever safety deficiencies are observed. The Government's safety comments will be included in its export file to the Contractor. The Contractor shall regularly update the correction status of the safety comments. In addition, the Contractor shall utilize QCS to advise the Government of any accidents occurring on the jobsite. This brief supplemental entry is not to be considered as a substitute for completion of mandatory reports, e.g., ENG Form 3394 and OSHA Form 200.

1.6.3.5 Features of Work

The Contractor shall include a complete list of the features of work in the QCS database. A feature of work may be associated with multiple pay activities. However, each pay activity (see subparagraph "Pay Activity Data" of paragraph "Finances") will only be linked to a single feature of work.

1.6.3.6 QC Requirements

The Contractor shall develop and maintain a complete list of QC testing, transferred and installed property, and user training requirements in QCS. The Contractor shall update all data on these QC requirements as work progresses, and shall promptly provide this information to the Government via QCS.

1.6.4 Submittal Management

The Contractor shall develop the initial submittal register, ENG Form 4288, SUBMITTAL REGISTER, from the submittal list provided by its Designer of Record. Thereafter, the Contractor shall maintain a complete list of all submittals, including completion of all data columns. Dates on which submittals are received and returned by the Government will be included in its export file to the Contractor. The Contractor shall use QCS to track and transmit all submittals. ENG Form 4025, submittal transmittal form, and the submittal register update, ENG Form 4288, shall be produced using QCS. QCS and RMS will be used to update, store and exchange submittal registers and transmittals, but will not be used for storage of actual submittals.

1.6.5 Schedule

The Contractor shall develop a construction schedule consisting of pay activities, in accordance with Section 01320, PROJECT SCHEDULE. This schedule shall be input and maintained in the QCS database either manually or by using the Standard Data Exchange Format (SDEF) (see Section 01320 PROJECT SCHEDULE). The updated schedule data shall be included with each pay request submitted by the Contractor.

1.6.6 Import/Export of Data

QCS includes the ability to export Contractor data to the Government and to import submittal register and other Government-provided data, and schedule data using SDEF.

1.7 IMPLEMENTATION

Contractor use of QCS as described in the preceding paragraphs is mandatory. The Contractor shall ensure that sufficient resources are available to maintain its QCS database, and to provide the Government with regular database updates. QCS shall be an integral part of the Contractor's management of quality control.

1.8 DATA SUBMISSION VIA COMPUTER DISKETTE OR CD-ROM

The Government-preferred method for Contractor's submission of updates, payment requests, correspondence and other data is by E-mail with file attachment(s). For locations where this is not feasible, the Contracting Officer may permit use of computer diskettes or CD-ROM for data transfer. Data on the disks or CDs shall be exported using the QCS built-in export function. If used, diskettes and CD-ROMs will be submitted in accordance with the following:

1.8.1 File Medium

The Contractor shall submit required data on 3-1/2 inch double-sided high-density diskettes formatted to hold 1.44 MB of data, capable of running under Microsoft Windows 95 or newer. Alternatively, CD-ROMs may be used. They shall conform to industry standards used in the United States. All data shall be provided in English.

1.8.2 Disk or CD-ROM Labels

The Contractor shall affix a permanent exterior label to each diskette and/or CD-ROM submitted. The label shall indicate in English, the QCS file name, full contract number, contract name, project location, data date, name and telephone number of person responsible for the data.

1.8.3 File Names

The Government will provide the file names to be used by the Contractor with the QCS software.

1.9 MONTHLY COORDINATION MEETING

The Contractor shall update the QCS database each workday. At least monthly, the Contractor shall generate and submit an export file to the

Government with schedule update and progress payment request. As required in Contract Clause "Payments", at least one week prior to submittal, the Contractor shall meet with the Government representative to review the planned progress payment data submission for errors and omissions. The Contractor shall make all required corrections prior to Government acceptance of the export file and progress payment request. Payment requests accompanied by incomplete or incorrect data submittals will be returned. The Government will not process progress payments until an acceptable QCS export file is received.

1.10 NOTIFICATION OF NONCOMPLIANCE

The Contracting Officer will notify the Contractor of any detected noncompliance with the requirements of this specification. The Contractor shall take immediate corrective action after receipt of such notice. Such notice, when delivered to the Contractor at the work site, shall be deemed sufficient for the purpose of notification.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION (Not Applicable)

-- End of Section --

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DIVISION 01 - GENERAL REQUIREMENTS

SECTION 01320

PROJECT SCHEDULE

-- End of Section Table of Contents --

SECTION 01320

PROJECT SCHEDULE

PART 1 GENERAL

1.1 ELECTRONIC SCHEDULE REQUIREMENT

The Project Schedule to be prepared by the Contractor shall be electronically prepared using software capable of generating a data file in the Standard Data Exchange Format (SDEF). The Project Schedule shall consist of a network analysis system as described below. In preparing this system the scheduling of Construction is the sole responsibility of the contractor. The requirement for the system is included to assure adequate planning in the execution of the work and to assist the Contracting Officer in appraising the reasonableness of the proposed schedule and evaluating progress of the work for the purposes of payment.

1.2 SUBMITTALS

Government acceptance is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Preliminary Project Schedule; G.
Initial Project Schedule; G.
Periodic Schedule Updates; G.

Four copies of the schedules showing codes, values, categories, numbers, items, etc., as required.

Periodic schedule updates shall be submitted monthly.

SD-06 Test Reports

Narrative Report.
Schedule Reports.

Four copies of the reports showing numbers, descriptions, dates, float, starts, finishes, durations, sequences, etc., as required.

SD-07 Certificates

Qualifications; G.

Documentation showing qualifications of personnel preparing schedule reports.

1.3 QUALIFICATIONS

The Contractor shall designate an authorized representative who shall be responsible for the preparation of all required project schedule reports.

This person shall have previously created and reviewed computerized schedules using the software selected by the Contractor. Qualifications of this individual shall be submitted to the Contracting Officer for review with the Preliminary Project Schedule submission.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

3.1 GENERAL

Pursuant to the Contract Clause, SCHEDULE FOR CONSTRUCTION CONTRACTS, a Project Schedule as described below shall be prepared. The Contractor shall be responsible for scheduling of all design, procurement and construction activities. Contractor management personnel shall actively participate in its development. Designers of record, consultants, subcontractors and suppliers working on the project shall also contribute in developing and maintaining an accurate Project Schedule. The accepted Project Schedule shall be used to measure the progress of the work, to aid in evaluating time extensions, and to provide the basis of all progress payments.

3.1.1 Fast Track Site Work Construction

Utilizing the 90 percent drawings and specifications, the Contractor shall commence work on the infrastructure work of the ball field.

3.2 BASIS FOR PAYMENT

The schedule shall be the basis for measuring Contractor progress. Lack of an accepted schedule or scheduling personnel shall result in an inability of the Contracting Officer to evaluate Contractor progress for the purposes of payment. Failure of the Contractor to provide all information, as specified below, shall result in the disapproval of the entire Project Schedule submission and the inability of the Contracting Officer to evaluate Contractor progress for payment purposes. In the case where Project Schedule revisions have been directed by the Contracting Officer and those revisions have not been included in the Project Schedule, then the Contracting Officer may hold retainage up to the maximum allowed by contract, each payment period, until revisions to the Project Schedule have been made.

3.3 ELECTRONIC PROJECT SCHEDULE

The computer software system utilized by the Contractor to produce the Project Schedule shall be capable of providing all requirements of this specification. Failure of the Contractor to meet the requirements of this specification shall result in the disapproval of the schedule. Manually generated schedules will not be accepted.

The system noted below is capable of generating a file in the Standard Data Exchange Format (SDEF). All electronic data submittals shall be in SDEF. SDEF information is available from the Contracting Officer.

Vendor/System with SDEF support:

Primavera Systems	PRIMAVERA PROJECT PLANNER (P3)

3.3.1 Use of the Critical Path Method

The Critical Path Method (CPM) of network calculation shall be used to generate the Project Schedule. The Contractor shall provide the Project Schedule in either the Precedence Diagram Method (PDM) or the Arrow Diagram Method (ADM).

3.3.2 Level of Detail Required

With the exception of the preliminary schedule submission, the Project Schedule shall include an appropriate level of detail. Failure to develop or update the Project Schedule or provide data to the Contracting Officer at the appropriate level of detail, as specified by the Contracting Officer, shall result in the disapproval of the schedule. The Contracting Officer will use, but is not limited to, the following conditions to determine the appropriate level of detail to be used in the Project Schedule.

3.3.2.1 Activity Durations

Contractor submissions shall follow the direction of the Contracting Officer regarding reasonable activity durations. Reasonable durations are those that allow the progress of activities to be accurately determined between payment periods (usually less than 2 percent of all non-procurement activities' Original Durations shall be greater than 20 days).

3.3.2.2 Design and Permit Activities

The Contractor shall integrate design and permitting activities, including necessary conferences and follow-up actions and design package submission dates into the schedule. The design schedule showing the sequence of events involved in carrying out the design tasks within the specific contract period shall be included in the project schedule. The design schedule should be at a detailed level of scheduling sufficient to identify all major tasks including those that control the flow of work. The design schedule shall include review and correction periods associated with each item. This should be a forward planning as well as a project-monitoring tool. The schedule shall reflect calendar days and not specific dates for each activity. If the design schedule is changed, the Contractor shall submit a revised schedule reflecting the change within seven calendar days of the change.

3.3.2.3 Procurement Activities

Tasks related to the procurement of long lead materials or equipment shall be included as separate activities in the project schedule. Long lead materials and equipment are those materials that have a procurement cycle of over 90 days. Examples of procurement process activities include, but are not limited to: submittals, approvals, procurement, fabrication, delivery, installation, start-up, and testing.

3.3.2.4 Government Activities

Government and other agency activities that could impact progress shall be shown. These activities include, but are not limited to: design reviews, submittal reviews, environmental permit approvals by State regulators, inspections, utility tie-in, Government Furnished Equipment (GFE) and notice to proceed for phasing requirements.

3.3.2.5 Responsibility

All activities shall be identified in the project schedule by the party responsible to perform the work. Responsibility includes, but is not limited to, the subcontracting firm, contractor work force, or government agency performing a given task. The responsible party for each activity shall be identified by the Responsibility Code.

3.3.2.6 Work Areas

All activities shall be identified in the project schedule by the work area in which the activity occurs. Activities shall not be allowed to cover more than one work area. The work area of each activity shall be identified by the Work Area Code.

3.3.2.7 Modification or Claim Number

Any activity that is added or changed by contract modification or used to justify claimed time shall be identified by a mod or claim code that changed the activity. Activities shall not belong to more than one modification or claim item. The modification or claim number of each activity shall be identified by the Mod or Claim Number.

3.3.2.8 Bid Item

All activities shall be identified in the project schedule by the Contract Line Item to which the activity belongs. An activity shall not contain work in more than one line item. The line item for each appropriate activity shall be identified by the Bid Item Code.

3.3.2.9 Feature of Work

All activities shall be identified in the project schedule according to the feature of work to which the activity belongs. Feature of work refers, but is not limited to a work breakdown structure for the project. The feature of work for each activity shall be identified by the Feature of Work Code.

3.3.3 Scheduled Project Completion

The schedule interval shall extend from notice-to-proceed to the contract completion date.

3.3.3.1 Project Start Date

The schedule shall start no earlier than the date that the Notice to Proceed (NTP) was acknowledged. The Contractor shall include as the first activity in the project schedule an activity called "Start Project". The "Start Project" activity shall have: an "ES" constraint, a constraint date equal to the date that the NTP was acknowledged, and a zero day duration.

3.3.3.2 Constraint of Last Activity

Completion of the last activity in the schedule shall be constrained by the contract completion date. Calculation on project updates shall be such that if the early finish of the last activity falls after the contract completion date, then the float calculation shall reflect a negative float on the critical path. The Contractor shall include as the last activity in the project schedule an activity called "End Project". The "End Project" activity shall have: an "LF" constraint, a constraint date equal to the completion date for the project, and a zero day duration.

3.3.3.3 Early Project Completion

In the event the project schedule shows completion of the project prior to the contract completion date, the Contractor shall identify those activities that have been accelerated and/or those activities that are scheduled in parallel to support the Contractor's "early" completion. Contractor shall specifically address each of the activities noted at every project schedule update period to assist the Contracting Officer in evaluating the Contractor's ability to actually complete prior to the contract period.

3.3.4 Interim Completion Dates

Contractually specified interim completion dates shall also be constrained to show negative float if the early finish date of the last activity in that phase falls after the interim completion date. The completion dates of each phase of the design-build contract shall be identified as interim completion dates on the Project Schedule.

3.3.5 Default Progress Data Disallowed

Actual Start and Finish dates shall not be automatically updated by default mechanisms that may be included in CPM scheduling software systems. Actual Start and Finish dates on the CPM schedule shall match those dates provided from Contractor Quality Control Reports. Failure of the Contractor to document the Actual Start and Finish dates on the Daily Quality Control report for every in-progress or completed activity and ensure that the data contained on the Daily Quality Control reports is the sole basis for schedule updating shall result in the disapproval of the Contractor's schedule and the inability of the Contracting Officer to evaluate Contractor progress for payment purposes.

3.3.6 Out-of-Sequence Progress

Activities that have posted progress without predecessors being completed (Out-of-Sequence Progress) will be allowed only on a case-by-case acceptance of the Contracting Officer. The Contracting Officer may direct that changes in schedule logic be made to correct any or all out-of-sequence work.

3.3.7 Extended Non-Work Periods

Designation of Holidays to account for non-work periods of over 5 days will not be allowed. Non-work periods of over 5 days shall be identified by addition of activities that represent the delays. Modifications to the logic of the project schedule shall be made to link those activities that may have been impacted by the delays to the newly added delay activities.

3.3.8 Negative Lags

Lag durations contained in the project schedule shall not have a negative value.

3.4 PROJECT SCHEDULE SUBMISSIONS

The Contractor shall provide the submissions as described below. The data disk, reports, and network diagrams required for each submission are contained in paragraph SUBMISSION REQUIREMENTS.

3.4.1 Preliminary Project Schedule Submission

The Preliminary Project Schedule, defining the Contractor's planned operations for the first 90 calendar days shall be submitted for approval within 20 calendar days after Notice to Proceed is acknowledged. The accepted preliminary schedule shall be used for payment purposes not to exceed 90 calendar days after Notice to Proceed.

3.4.2 Initial Project Schedule Submission

The Initial Project Schedule shall be submitted for acceptance within 60 calendar days after Notice to Proceed. The schedule shall provide a reasonable sequence of activities, which represent work through the entire project and shall be at a reasonable level of detail.

3.4.3 Periodic Schedule Updates

Based on the result of progress meetings, specified in "Periodic Progress Meetings," the Contractor shall submit periodic schedule updates. These submissions shall enable the Contracting Officer or to assess Contractor's progress. If the Contractor fails or refuses to furnish the information and project schedule data, which in the judgment of the Contracting Officer or authorized representative, is necessary for verifying the contractor's progress, the Contractor shall be deemed not to have provided an estimate upon which progress payment may be made.

3.4.4 Standard Activity Coding Dictionary

The Contractor shall submit, with the Initial Project Schedule, a coding scheme that shall be used throughout the project for all activity codes contained in the schedule. The coding scheme submitted shall list the values for each activity code category and translate those values into project specific designations. For example, a Responsibility Code Value, "ELE", may be identified as "Electrical Subcontractor." Activity code values shall represent the same information throughout the duration of the contract. Once accepted with the Initial Project Schedule submission, changes to the activity coding scheme must be accepted by the Contracting Officer. the activity coding scheme must be accepted by the Contracting Officer.

3.5 SUBMISSION REQUIREMENTS

The following items shall be submitted by the Contractor for the initial submission, and every periodic project schedule update throughout the life of the project:

3.5.1 Data Disks

Two data disks or two sets of data disks containing the project schedule shall be provided. Data on the disks shall be in the Standard Data Exchange Format (SDEF), in accordance with ER-1-1-11, PROGRESS, SCHEDULES, AND NETWORK ANALYSIS SYSTEMS, Appendix A, Standard Data Exchange Format Specification (attached at the end of this Project Schedule specification).

3.5.1.1 File Medium

Required data shall be submitted on 3.5-inch disks, formatted to hold 1.44

MB of data, under the MS-Windows operating system.

3.5.1.2 Disk Label

A permanent exterior label shall be affixed to each disk submitted. The label shall indicate the type of schedule (Initial, Update, or Change), full contract number, project name, project location, data date, name and telephone number or person responsible for the schedule, and the operating system and version used to format the disk.

3.5.1.3 File Name

Each file submitted shall have a name related to either the schedule data date, project name, or contract number. The Contractor shall develop a naming convention that will ensure that the names of the files submitted are unique. The Contractor shall submit the file naming convention to the Contracting Officer for approval.

3.5.2 Narrative Report

A Narrative Report shall be provided with each update of the project schedule. This report shall be provided as the basis of the Contractor's progress payment request. The Narrative Report shall include: a description of activities along the critical path(s), a description of current and anticipated problem areas or delaying factors and their impact, and an explanation of corrective actions taken.

3.5.3 Accepted Changes Verification

Only project schedule changes that have been previously accepted by the Contracting Officer shall be included in the schedule submission. The Narrative Report shall specifically reference, on an activity by activity basis, all changes made since the previous period and relate each change to documented, accepted schedule changes

3.5.4 Schedule Reports

The format for each activity for the schedule reports listed below shall contain: Activity Numbers, Activity Description, Original Duration, Remaining Duration, Early Start Date, Early Finish Date, Late Start Date, Late Finish Date, Total Float. Actual Start and Actual Finish Dates shall be printed for those activities in progress or completed.

3.5.4.1 Activity Report

A list of all activities sorted according to activity number and then sorted according to Early Start Date. For completed activities the Actual Start Date shall be used as the secondary sort.

3.5.4.2 Logic Report

A list of Preceding and Succeeding activities for every activity in ascending order by activity number and then sorted according to Early Start Date. For completed activities the Actual Start Date shall be used as the secondary sort.

3.5.4.3 Total Float Report

A list of all activities sorted in ascending order of total float.

Activities that have the same amount of total float shall be listed in ascending order of Early Start Dates.

3.5.4.4 Earnings Report

A compilation of the Contractor's Total Earnings on the project from the Notice to Proceed until the most recent Monthly Progress Meeting. This report shall reflect the Earnings of specific activities based on the agreements made in the field and approved between the Contractor and Contracting Officer at the most recent Monthly Progress Meeting. Provided that the Contractor has provided a complete schedule update, this report shall serve as the basis of determining Contractor Payment. Activities shall be grouped by bid item and sorted by activity numbers. This report shall: sum all activities in a bid item and provide a bid item percent; and complete and sum all bid items to provide a total project percent complete. The printed report shall contain, for each activity: Activity Number, Activity Description, Original Budgeted Amount, Total Quantity, Quantity to Date, Percent Complete (based on cost), Earnings to Date.

3.5.5 Network Diagram

The network diagram shall be required on the initial schedule submission, on monthly schedule update submissions, or whenever any logic changes have occurred, to include addition or deletion of activities due to modifications to the project. The network diagram shall depict and display the order and interdependence of activities and the sequence in which the work is to be accomplished. The activity or event number, description, duration, and estimated earned value shall be shown on the diagram. The Contracting Officer will use, but is not limited to, the following conditions to review compliance with this paragraph:

3.5.5.1 Continuous Flow

Diagrams shall show a continuous flow from left to right with no arrows from right to left. The activity or event number, description, duration, and estimated earned value shall be shown on the diagram.

3.5.5.2 Project Milestone Dates

Dates shall be shown on the diagram for start of project, any contract required interim completion dates, and contract completion dates.

3.5.5.3 Critical Path

The critical path shall be clearly shown.

3.5.5.4 Banding

Activities shall be grouped to assist in the understanding of the activity sequence. Typically, this flow will group activities by work area and/or responsibility.

3.5.5.5 S-Curves

A graph of anticipated earnings (S-Curves) showing cumulative for the duration of the project. The vertical scale shall show earnings/percent complete from 0%-100%. The horizontal scale shall be a time scale showing the calendar months of the project. Three curves shall be plotted on the same graph; the earnings/percent complete based on early finish dates; the earnings/percent complete based on late finish dates; the actual earnings/percent complete to date.

3.5.5.6 Bar Chart

A bar chart covering the previous month's activities and progress, and the planned activities over 3 months projected into the future. The chart shall also include actual and anticipated earnings.

3.6 PERIODIC PROGRESS MEETINGS

Progress meetings to discuss payment shall include a monthly onsite meeting or other regular intervals mutually agreed to at the preconstruction conference. During this meeting the Contractor shall describe, on an activity by activity basis, all proposed revisions and adjustments to the project schedule required to reflect the current status of the project. The Contracting Officer will accept activity progress, proposed revisions, and adjustments as appropriate.

3.6.1 Meeting Attendance

The Contractor's Project Manager and Scheduler shall attend the regular progress meeting.

3.6.2 Update Submission Following Progress Meeting

A complete update of the project schedule containing all accepted progress, revisions, and adjustments, based on the regular progress meeting, shall be submitted not later than 4 working days after the monthly progress meeting.

3.6.3 Progress Meeting Contents

Update information, including Actual Start Dates, Actual Finish Dates, Remaining Durations, and Cost-to-Date shall be subject to the approval of the Contracting Officer. The following is a minimum set of items that the Contractor shall address, on an activity by activity basis, during each progress meeting.

3.6.3.1 Start and Finish Dates

The Actual Start and Actual Finish dates for each activity currently in-progress or completed activities.

3.6.3.2 Time Completion

The estimated Remaining Duration for each activity in-progress. Time-based progress calculations must be based on Remaining Duration for each activity.

3.6.3.3 Cost Completion

The earnings for each activity started. Payment will be based on earnings for each in-progress or completed activity. Payment for individual activities will not be made for work that contains quality defects. A portion of the overall project amount may be retained based on delays of activities.

3.6.3.4 Logic Changes

All logic changes pertaining to Notice to Proceed on change orders, change orders to be incorporated into the schedule, contractor proposed changes in work sequence, corrections to schedule logic for out-of-sequence progress, lag durations, and other changes that have been made pursuant to contract provisions shall be specifically identified and discussed.

3.6.3.5 Other Changes

Other changes required due to delays in completion of any activity or group of activities include: 1) delays beyond the Contractor's control, such as strikes and unusual weather. 2) delays encountered due to submittals, Government Activities, deliveries or work stoppages which make re-planning the work necessary, and 3) a schedule which does not represent the actual prosecution and progress of the work.

3.7 REQUESTS FOR TIME EXTENSIONS

In the event the Contractor requests an extension of the completion date, he shall furnish such justification, project schedule data and supporting evidence as the Contracting Officer may deem necessary for a determination as to whether or not the Contractor is entitled to an extension of time under the provisions of the contract. Submission of proof of delay, based on revised activity logic, duration, and costs (updated to the specific date that the delay occurred) is obligatory to any acceptance.

3.7.1 Justification of Delay

The project schedule shall clearly display that the Contractor has used, in full, all the float time available for the work involved with this request. The Contracting Officer's determination as to the number of allowable days of time extension shall be based upon the project schedule updates in effect for the time period in question, and other factual information. Actual delays that are found to be caused by the Contractor's own actions, which result in the extension of the schedule, will not be a cause for a time extension to the project completion date.

3.7.2 Submission Requirements

The Contractor shall submit a justification for each request for a change in the project completion date of under 2 weeks based upon the most recent schedule update at the time of the Notice to Proceed or constructive direction issued for the change. Such a request shall be in accordance with the requirements of other appropriate Contract Clauses and shall include, as a minimum:

a. A list of affected activities, with their associated project schedule activity number.

b. A brief explanation of the causes of the change.

c. An analysis of the overall impact of the changes proposed.

d. A sub-network of the affected area.

Activities impacted in each justification for change shall be identified by a unique activity code contained in the required data file.

3.7.3 Additional Submission Requirements

For any requested time extension of over 2 weeks, the Contracting Officer may request an interim update with revised activities for a specific change request. The Contractor shall provide this disk within 4 days of the Contracting Officer's request.

3.8 DIRECTED CHANGES

If Notice to Proceed (NTP) is issued for changes prior to settlement of price and/or time, the Contractor shall submit proposed schedule revisions to the Contracting Officer within 2 weeks of the NTP being issued. The proposed revisions to the schedule will be accepted by the Contracting Officer prior to inclusion of those changes within the project schedule. If the Contractor fails to submit the proposed revisions, the Contracting Officer may furnish the Contractor suggested revisions to the project schedule. The Contractor shall include these revisions in the project schedule until revisions are submitted, and final changes and impacts have been negotiated. If the Contractor has any objections to the revisions furnished by the Contracting Officer, the Contractor shall advise the Contracting Officer within 2 weeks of receipt of the revisions. Regardless of the objections, the Contractor shall continue to update the schedule with the Contracting Officer's revisions until a mutual agreement in the revisions is reached. If the Contractor fails to submit alternative revisions within 2 weeks of receipt of the Contracting Officer's proposed revisions, the Contractor will be deemed to have concurred with the Contracting Officer's proposed revisions. The proposed revisions will then be the basis for an equitable adjustment for performance of the work.

3.9 OWNERSHIP OF FLOAT

Float available in the schedule, at any time, shall not be considered for the exclusive use of either the Government or the Contractor.

-- End of Section --

STANDARD DATA EXCHANGE FORMAT SPECIFICATION

PART 1- GENERAL

1. Application of This Provision: The Standard Data Exchange Format (SDEF) provides a non-proprietary protocol to exchange project planning and progress data between scheduling systems.

2. File Type and Format: The data file shall consist of a 132 character, freed format, "ASCII" file. Text shall be left-justified and numbers shall be right-justified in each field. Data records must conform, exactly, to the sequence, column position, maximum length, mandatory values, and field definitions described below to comply with the SDEF. Unless specifically stated, all numbers shall be whole numbers. Fields containing numbers shall not be zero filled. All data columns shall be separated by a single blank column. The file shall not contain blank lines.

3. Usage Notes: Where appropriate, notes regarding proper usage of systems to support the SDEF have been included in brackets ([ ]). These notes are included to assist users in creating SDEF-compatible files, given the variety of software systems that support the SDEF.

4. Recommended Systems: Several systems have been tested to determine the accuracy of importing and exporting SDEF files. For information on the current list of recommended systems, please contact Mr. Stan Green at HQUSACE, (202) 761-0206. Although the currently listed system have been tested other systems may also be acceptable provided those systems correctly import and export SDEF files.

5. SDEF Checker Program: A program that checks whether a file meets the SDEF is available free of charge. A copy of this program may be obtained by written request to: U.S. Army Corps of Engineers, ATTN: Mr. Bill East (CECER-FFA), P.O. Box 9005, Champaign, IL 61826-90005. A description of the SDEF Checker is also available on the Internet and CivilNet.

PART 2- SDEF SPECIFICATION

6. SDEF Organization: The SDEF shall consist of the following records provided in the exact sequence shown below:

Paragraph Reference	Record Description	Remarks
6.a	Volume Record	Mandatory First Line of File
6.b	Project Record	Mandatory Second Line of File
6.c	Calendar Record(s)	Mandatory One Record Minimum
6.d	Holiday Record(s)	Mandatory if Holidays Used
6.e	Activity Record(s)	Mandatory Records
6.f	Precedence Record(s)	Mandatory for Precedence
6.g	Unit Cost Record(s)	Mandatory for Unit Costs
6.h	Progress Record(s)	Mandatory Records
6.i	File End Record	Mandatory Last Line of Disk/File

6.a. Volume Record: The Volume Record shall be used to control the transfer of data that may not fit on a single disk. The first line in every file used to store SDEF data shall be the Volume Record. The Volume Record shall sequentially identify the number of the data transfer disk(s). The Volume Record shall have the following format:

Description	Column Position	Max. Len.	Req. Value	Type	Notes
RECORD IDENTIFIER	1 - 4	4	VOLM	Fixed	Filled
DISK NUMBER	6 - 7	2	√	Number	Right Justified

6.a.(l) The RECORD IDENTIFIER is the first four characters of this record. The required value for this field shall be "VOLM". The VOLM record must appear on the first line of the SDEF data file.

6.a.(2) The DISK NUMBER field shall identify the number of the data disk used to store the data exchange information. If all data may be contained on a single disk, this field shall contain the value of "l". If more disks are required, then the second disk shall contain the value "2", the third disk shall be designated with a "3", and so on. Identifcation of the last data disk is accomplished in the Reject End Record.

6.b. Project Record: The Project Identifier Record shall contain general project information. Because more than one SDEF file may be required for data transfer between large projects, the PROJ record shall be the second line of the first SDEF file transferred. The PROJ record shall contain information in the following format:

Description	Column Position	Max. Len.	Req. Value	Type	Notes
RECORD IDENTIFIER	1- 4	4	PROJ	Fixed	Filled
DATA DATE	6- 12	7	√	ddmmmyy	Filled
PROJECT IDENTIFIER	14-17	4	√	Alpha.	Left Justified
PROJECT NAME	19-66	48	√	Alpha.	Left Justified
CONTRACTOR NAME	68-103	36	√	Alpha.	Left Justified
ARROW OR PRECEDENCE	105-105	1	A,P	Fixed	Filled
CONTRACT NUMBER	107-112	6	√	Alpha.	Left Justified
PROJECT START	114-120	7	√	ddmmmyy	Filled
PROJECT END	122-128	7	√	ddmmmyy	Filled

6.b.(1) The RECORD IDENTIFIER is the first four characters of this record. The required value for this field shall be "PROJ". This record shall contain the general project information and indicates which scheduling method shall be used.

6.b.(2) The DATA DATE is the date of the schedule calculation. The abbreviation "ddmmmyy" refers to a date format that shall translate a date into two numbers for the day, three letters for the month, and two numbers for the year. For example, March 1, 1999 shall be translated into OlMar99. This same convention for date formats shall be used throughout the entire data format. To ensure that dates are translated consistently, the following abbreviations shall be used for the three character month code:

Abbreviation	Month
JAN	January
FEB	February
MAR	March
APR	April
MAY	May
JUN	June
JUL	July
AUG	August
SEP	September
OCT	October
NOV	November
DEC	December

6.b.(3) The PROJECT IDENTIFIER is a maximum four character abbreviation for the schedule. These four characters shall be used to uniquely identify the project and specific update as agreed upon by Contractor and Contracting Officer. When utilizing scheduling software these four characters shall be used to select the project. Software manufacturers shall provide information to users to ensure that data importing programs do not automatically overwrite other schedules with the same PROJECT IDENTIFIER.

6.b.(4) The PROJECT NAME field shall contain the name and location of the project edited to fit the space provided. The data appearing here shall appear on scheduling software reports. The abbreviation "Alpha." refers to an "Alphanumeric" field value and shall be used throughout the remainder of this specification.

6.b.(5) The CONTRACTOR NAME field shall contain the Construction Contractor's name, edited to fit the space provided.

6.b.(6) The ARROW OR PRECEDENCE field shall indicate which method shall be used for calculation of the schedule. The value "A" shall signify the Arrow Diagramming Method. The value "P" shall signify the Precedence Diagramming Method. The ACTIVITY ID field of the Activity Record shall be interpreted differently depending on the value of this field. The Precedence Record shall be required if the value of this field is "P". [Usage note: software systems may not support both arrow and precedence diagramming. It is recommended that the selection of the type of network be based on the capabilities of the software used by project partners.]

6.b.(7) The CONTRACT NUMBER field shall contain the contract number for the project. For example, the construction contract number DACA85-89-C-0001 shall be entered into this field as "890001".

6.b.(8) The PROJECT START field shall contain the date that the Contractor acknowledges the Notice to Proceed (NTP). [Usage note: Software systems may use a project start date to constrain the first activity of a network. To ensure consistent scheduling calculations across products, it is recommended that the first activity in the schedule contain an EARLY START constraint and a software system's PROJECT START date only be used to report on the project's start date.]

6.b.(9) The PROJECT END field shall contain the date that the Contractor plans to complete the work as approved by the Contracting Officer. [Usage note: software systems may use a project end date to constrain the last activity of a network. To ensure consistent scheduling calculations across products, it is recommended that the last activity in the schedule contain an EARLY START constraint and a software system's PROJECT END date only be used to report on the project's end date.]

6.c. Calendar Record: The Calendar Record(s) shall follow the Project Identifier Record in the first disk of data transferred. A minimum of one Calendar Record shall be required for all data exchange activity files. The format for the Calendar Record shall be as follows:

Description	Column Position	Max. Len.	Req. Value	Type	Notes
RECORD IDENTIFIER	1 - 4	4	CLDR	Fixed	Filled
CALENDAR CODE	6 - 6	1	√	Alpha.	Filled
WORKDAYS	8 - 14	7	SMTWTFS	Fixed	Filled
CALENDAR DESCRIPTION	16-45	30	√	Alpha.	Left Justified

6.c.(1) The RECORD IDENTIFIER shall always begin with "CLDR" to identify it as a Calendar Record. Each Calendar Record used shall have this identification in the first four columns. [Usage note: Systems contain a variety of calendar options. It is recommended that the least common denominator of calendar features between the systems be used as the basis for creating the SDEF file for a given project.]

6.c.(2) The CALENDAR CODE shall be used in the activity records to signify that this calendar is associated with the activity. [Usage note: Some systems do not allow for alphanumeric CALENDAR CODES, but only allow positive integers from 1 to 9. It is recommended that only positive integers be used for the CALENDAR CODE field to support the widest variety of scheduling systems.]

6.c.(3) The WORKDAYS field shall contain the work-week pattern selected with "Y", for Yes, and "N", for No. The first character shall be Sunday and the last character Saturday. An example of a typical five (5) day work-week would be NYYYYYN. A seven (7) day work-week would be YYYYYYY.

6.c.(4) The CALENDAR DESCRIPTION shall be used to briefly describe the calendar used.

6.d. Holiday Record: The Holiday Record(s) shall follow the Calendar Record(s) in the first disk of data transferred. There may be calendars without any holidays designated or several Holiday Records for each Calendar Record(s). The format for the Holiday Record shall be as follows:

Description	Column Position	Max. Len.	Req. Value	Type	Notes
RECORD IDENTIFIER	1 - 4	4	HOLI	Fixed	Filled
CALENDAR CODE	6 - 6	1	√	Alpha.	Filled
HOLIDAY DATE	8 - 14	7	√	ddmmmyy	Filled
HOLIDAY DATE	16-22	7	-	ddmmmyy	May be Filled
HOLIDAY DATE	24-30	7	-	ddmmmyy	May be Filled
HOLIDAY DATE	32-38	7	-	ddmmmyy	May be Filled
HOLIDAY DATE	40-46	7	-	ddmmmyy	May be Filled
HOLIDAY DATE	48-54	7	-	ddmmmyy	May be Filled
HOLIDAY DATE	56-62	7	-	ddmmmyy	May be Filled
HOLIDAY DATE	64-70	7	-	ddmmmyy	May be Filled
HOLIDAY DATE	72-78	7	-	ddmmmyy	May be Filled
HOLIDAY DATE	80-86	7	-	ddmmmyy	May be Filled
HOLIDAY DATE	88-94	7	-	ddmmmyy	May be Filled
HOLIDAY DATE	96-102	7	-	ddmmmyy	May be Filled
HOLIDAY DATE	104-110	7	-	ddmmmyy	May be Filled
HOLIDAY DATE	112-118	7	-	ddmmmyy	May be Filled
HOLIDAY DATE	120-126	7	-	ddmmmyy	May be Filled

6.d.(1) The RECORD IDENTIFIER shall always begin with "HOLI". Each Holiday Record used shall have this identification in the first four columns.

6.d.(2) The CALENDAR CODE indicates which work-week calendar the holidays shall be applied to. More than one HOLI record may be used for a given CALENDAR CODE.

6.d.(3) The HOLIDAY DATE shall contain the date of each individual non-work day.

6.e. Activity Records: Activity Records shall follow any Holiday Record(s). If there are no Holiday Record(s), then the Activity Records shall follow the Calendar Record(s). There shall be one Activity Record for every activity in the network. Each activity shall have one record in the following format:

Description	Column Position	Max. Len.	Req. Value	Type	Notes
RECORD IDENTIFIER	1-4	4	ACTV	Fixed	Filled
ACTIVITY ID	6-15	10	√	Integer	See Comment Below
ACTIVITY DESCR.	17-46	30	√	Alpha.	Left Justified
ACTIVITY DURATION	48-50	3	√	Integer	Right Justified
CONSTRAINT DATE	52-58	7		ddmmmyy	May be Filled
CONSTRAINT TYPE	60-61	2		ES or LF	May be Filled
CALENDAR CODE	63-63	1	√	Alpha.	Filled
HAMMOCK CODE	65-65	1	Y, blank	Fixed	May be Filled
WORKERS PER DAY	67-69	3		Integer	Right Justified
RESPONSIBILITY CODE	71-74	4		Alpha.	Left Justified
WORK AREA CODE	76-79	4		Alpha.	Left Justified
MOD OR CLAIM NO.	81-86	6		Alpha.	Left Justified
BID ITEM	88-93	6		Alpha.	Left Justified
PHASE OF WORK	95-96	2		Alpha.	Left Justified
CATEGORY OF WORK	98-98	1		Alpha.	May be Filled
FEATURE OF WORK	100-128	30		Alpha.	Left Justified

6.e.(1) The RECORD IDENTIFIER for each activity description record must begin with the four character "ACTV" code. This field shall be used for both the Arrow Diagram Method (ADM) and Precedence Diagram Method (PDM).

6.c.(2) The ACTIVITY ID consists of coding that shall differ, depending on whether the ADM or PDM method was selected in the Project Record. If the ADM method was selected then the field shall be interpreted as two right-justified fields of five (5) integers each. If the PDM method was selected the field shall be interpreted as one (1) right-justified field of ten (10) integers each. The maximum activity number allowed under this arrangement is 99999 for ADM and 9999999999 for the PDM method. [Usage note: Many systems allow alphanumeric ACTIVITY IDs. While the SDEF does not strictly, allow the use of alphanumeric values, users may agree to use the ACTIVITY ID field to exchange alphanumeric data. It is recommended that the ACTIVITY ID be restricted to integers when one or more of the systems being used for scheduling allows only integer ACTIVITY ID values.]

6.e.(3) The ACTIVITY DESCRIPTION shall be a maximum of 30 characters. Descriptions must be limited to the space provided.

6.e.(4) The ACTIVITY DURATION contains the estimated original duration for the activity on the schedule. The duration shall be based upon the work-week designated by the activity's related calendar.

6.e.(5) The CONSTRAINT DATE field shall be used to identify a date that the scheduling system may use to modify float calculations. If there is a date in this field, then there must be a valid entry in the CONSTRAINT TYPE field.

6.e.(6) The CONSTRAINT TYPE field shall be used to identify the way that the scheduling system shall use the CONSTRAINT DATE to modify schedule float calculations. If there is a value in this field, then there must be a valid entry in the CONSTRAINT DATE field. The valid values for the CONSTRAINT TYPE are as follows:

Code	Definition
ES	The CONSTRAINT DATE shall replace an activity's early start date, if the early start date is prior to the CONSTRAINT DATE.
LF	The CONSTRAINT DATE shall replace an activity's late finish date, if the late finish date is after the CONSTRAINT DATE.

[Usage note: Systems provide a wide variety of constraint types that may not be supported by other systems. It is recommended that constraint types be restricted to the values above regardless of the capabilities of the various systems being used for scheduling.]

6.e.(7) The CALENDAR CODE relates this activity to an appropriate work-week calendar. The ACTIVITY DURATION must be based on the valid work-week referenced by this CALENDAR CODE field.

6.e.(8) The HAMMOCK CODE indicates that a particular activity does not have its own independent duration, but takes its start dates from the start date of the preceding activity (or node) and takes its finish dates from the finish dates of its succeeding activity (or node). If the value of the HAMMOCK CODE field is "Y", then the activity is a hammmock activity.

6.e.(9) The WORKERS PER DAY shall contain the average number of workers expected to work on the activity each day the activity is in progress. If this code is required by project scheduling specifications, values for this data will be right justified. Activities without workers per day shall have a value of "0".

6.e.(10) The RESPONSIBILITY CODE shall identify the subcontractors or major trade involved with completing the work for the activity. If this code is required by project scheduling specifications, value for this data will be left justified.

6.e.(11) The WORK AREA CODE shall identify the location of the activity within the project. If this code is required by project scheduling specifications, value for this data will be left justified.

6.e.(12) The MOD OR CLAIM NUMBER shall uniquely identify activities that are added or changed on a construction contract modification, or activities that justify any claimed time extensions. If this code is required by project scheduling specifications, value for this data will be left justified.

6.e.(13) The BID ITEM shall identify the bid item number associated with each activity. If this code is required by project scheduling specifications, value for this data will be left justified.

6.e.(14) The PHASE OF WORK shall identify the timing of a specific activity within the entire project. If this code is required by project scheduling specifications, value for this data will be left justified.

6.e.(15) The CATEGORY OF WORK shall identify the general type of work performed by every activity. If this code is required by project scheduling specifications, value for this data will be placed in the field.

6.e.(16) The FEATURE OF WORK shall identify a very broad designation of the general type of work that is being accomplished by the activity. If this code is required by project scheduling specifications, value for this data will be left justified. [Usage note: Many systems require that FEATURE OF WORK values be placed in several activity code fields. It is recommended that users review SDEF documentation to determine the correct way to use a given software system to produce the FEATURE OF WORK code.]

6.f. Precedence Record: The Precedence Record(s) shall follow the Activity Records if a Precedence Diagram Method schedule (PDM) is identified in the ARROW OR PRECEDENCE field of the Project Record. The Precedence Record has the following format:

Description	Column Position	Max. Len.	Req. Value	Type	Notes
RECORD IDENTIFIER	1 - 4	4	PRED	Fixed	Filled
ACTIVITY ID	6-15	10	√	Integer	See Comment Below
PRECEDING ACTIVITY	17 -26	10	√	Integer	See Comment Below
PREDECESSOR TYPE	28-28	1	√	S, F, C	Filled
LAG DURATION	30-33	4	√	Integer	Right Justified

6.f.(1) The RECORD IDENTIFIER shall begin with the four characters "PRED" in the first four columns of the record.

6.f.(2) The ACTIVITY ID identifies the activity whose predecessor shall be specified in this record.

6.f.(3) The PRECEDING ACTIVITY number is the number of an activity that precedes the activity noted in the ACTIVITY ID field.

6.f.(4) The PREDECESSOR TYPE field indicates the type of relation that exists between the chosen pair of activities. Valid PREDECESSOR TYPE fields areas follows:

Code	Definition
S	Start-to-Start relation
F	Finish-to-Finish relation
C	Finish-to-Start relation

[Usage note: Some systems provide additional predecessor types that may not be supported by all other systems. It is recommended that predecessor types be restricted to the values above regardless of the capabilities of the various systems being used for scheduling.]

6.f.(5) The LAG DURATION field contains the number of days delay between the preceding and current activity. [Usage note: Some systems allow negative values for the LAG DURATION. Because these values are not supported by all other systems, it is recommended that values be restricted to zero and positive integers.]

6.g. Unit Cost Record: The Unit Cost Record shall follow all Precedence Records. If the schedule utilizes the Arrow Diagram Method, then the Unit Cost Record shall follow any Activity records. There shall be one Unit Cost Record for every activity that is not a lump sum activity. [Usage note: (1) It is recommended that users who wish to exchange unit cost data contact SDEF vendor representatives to determine the ability of the software system to import/export unit cost information. (2) If the software being used by each member of the project team supports unit cost data then users may wish to conduct a trial run of the SDEF data exchange with a two or three-activity network to ensure that unit cost data transfers as expected. If problems are found please consult vendor representatives for resolution prior to exchange of full project schedules. (3) Unit cost record data does not, in most systems, result in the correct values being placed in the ACTIVITY COST and COST TO DATE fields of the Progress (PROG) Record. Users must, at this time, manually transfer the data from the Unit Cost Record to the Progress Record.

The fields for this record shall take the following format:

Description	Column Position	Max. Len.	Req. Value	Type	Notes
RECORD IDENTIFIER	1 - 4	4	UNIT	Fixed	Filled
ACTIVITY ID	6-15	10	√	Integer	See Comment Below
TOTAL QTY	17-29	13	√	Format 8.4	Right Justified
COST PER UNIT	31-43	13	√	Format 8.4	Right Justified
QTY TO DATE	45-57	13	√	Format 8.4	Right Justified
UNIT OF MEASURE	59-61	3	√	Alpha.	Left Justified

6.g.(1) The RECORD IDENTIFIER shall be identified with the four characters 'UNIT" placed in the first four columns of the record.

6.g.(2) The ACTIVITY ID for each activity shall match the format described in the activity record. Each activity may have only one Unit Cost Record.

6.g.(3) The TOTAL QTY is the total amount of material to be used in this activity. This number consists of eight digits, one decimal point and four more digits. An example of a number in this format is "11111111.1111". If decimal places are not needed this field shall still contain a ".0000" in columns 25-29. [Usage note: Many systems support a different format for this value that does not include as many decimal places. It is recommended that users determine their requirements for significant digits based on the lowest common denominator of the software systems being used for a given project.]

6.g.(4) The COST PER UNIT is the cost, in dollars and cents, for each unit to be used in this activity. This number consists of eight digits, one decimal point, and four more digits. An example of a number in this format is "11111111.1111". If decimal places are not needed this field shall still contain a ".0000" in columns 39-43. [Usage note: Many systems support a different format for this value that does not include as many decimal places. It is recommended that users determine their requirements for significant digits based on the lowest common denominator of the software systems being used for a given project.]

6.g.(5) The QTY TO DATE is the quantity of material installed in this activity up to the data date. This number consists of eight digits, one decimal point, and four more digits. An example of a number in this format is "11111111.1111". If decimal places are not needed this field shall still contain a ".0000" in columns 53-57. [Usage note: Many systems support a different format for this value that does not include as many decimal places. It is recommended that users determine their requirements for significant digits based on the lowest common denominator of the software systems being used for a given project.]

6.g.(6) The UNIT OF MEASURE is an abbreviation that may be used to describe the units being measured for this activity. Valid values for this field are any meaningful English or metric unit, except "LS" for Lump Sum. Lump Sum activities are not to have Unit Cost Records.

6.h. Progress Record: Progress Record(s) shall follow all Unit Cost Record(s). If there are no Unit Cost Record(s), then the Progress Record(s) shall follow all Precedence Records. If the schedule utilizes the Arrow Diagram Method, then the Progress Record shall follow any Activity Records. One Progress Record is required for every activity in the Activity Record. The fields for this Record shall be provided in the following format:

Description	Column Position	Max. Len.	Req. Value	Type	Notes
RECORD IDENTIFIER	1-4	4	PROG	Fixed	Filled
ACTIVITY ID	6-5	10	√	Integer	See Comment Below
ACTUAL START DATE	17-23	7	√	ddmmmyy	Filled if Started
ACTUAL FINISH DATE	25-31	7	√	ddmmmyy	Filled if Finished
REMAINING DURATION	33-35	3	√	Integer	Right Justified
ACTIVITY COST	37-48	12	√	Format 9.2	Right Justified
COST TO DATE	50-61	12	√	Format 9.2	Right Justitied
STORED MATERIAL	63-74	12	√	Format 9.2	Right Justified
EARLY START DATE	76-82	7	√	ddmmmyy	Filled if Not Started
EARLY FINISH DATE	84-90	7	√	ddmmmyy	Filled if Not Finished
LATE START DATE	92-98	7	√	ddmmmyy	Filled if Not Started
LATE FINISH DATE	100-106	7	√	ddmmmyy	Filled if Not Finished
FLOAT SIGN	108-108	1	+, -	Fixed	Filled if Not Finished
TOTAL FLOAT	110-112	3	√	Integer	R. Just. if Not Finished

6.h.(1) The RECORD IDENTIFIER shall begin with the four characters "PROG" in the first four columns of the record.

6.h.(2) The ACTIVITY ID for each activity for which progress has been posted shall match the format described in the Activity Record.

6.h.(3) An ACTUAL START DATE is required for all in-progress activities. The ACTUAL START DATE shall be the same as, or later than, the PROJECT START date contained in the Project Record. The ACTUAL START DATE shall also be the same as, or prior to, the DATA DATE contained in the Project Record. If there is an ACTUAL START DATE for an activity that there must also be a REMAINING DURATION, and the values for the EARLY START DATE and LATE START DATE are blank. [Usage note: Some systems allow default values for ACTUAL START DATE if the date is not entered by the user. Because the failure to include a start date for activities may result in different schedule calculations, it is recommended that the ACTUAL START DATE be required for all activities in progress.]

6.h.(4) An ACTUAL FINISH DATE is required for all completed activities. If the REMAINING DURATION of an activity is zero, then there must be an ACTUAL FINISH DATE. If there is an ACTUAL FINISH DATE, then values for the EARLY START DATE, LATE START DATE, EARLY FINISH DATE, LATE FINISH DATE, FLOAT SIGN, and TOTAL FLOAT shall be blank. [Usage note: Some systems allow default values for ACTUAL FINISH DATE if the date is not entered by the user. Because the failure to include a finish date for activities may result in different schedule calculations, it is recommended that the ACTUAL FINISH DATE be required for all activities in progress.]

6.h.(5)AREMAININ G DURATION is required for all activities. Activities that have not started shall have a remaining duration equal to their original duration. Activities completed based on time, shall have a zero (0) REMAINING DURATION. [Usage note: Systems have a variety of "short-cut" methods to determine the REMAINING DURATION value. It is recommended that users actually consider the time required to complete the remaining work on a given task, rather than allow a system to calculate the remaining duration based on the amount of work that has already been accomplished.]

6.h.(6) The ACTIVITY COST contains the estimated earned value of the work to be accomplished in the activity. An example of a number in this format is "1111111 11.11". If decimal places are not needed this field shall still contain a ".00" in the last three columns of this field. [Usage note: Users should inquire of software vendors if the user needs to add a zero in the data field to produce the default value "0.00".]

6.h.(7) The COST TO DATE contains the earned value for the activity. If there is an ACTUAL START DATE, then there must also be some value for COST TO DATE. An example of a number in this format is "111111111.11". If decimal places are not needed, this field shall still contain a ".00" in the last three columns of this field. The COST TO DATE is not tied to REMAINING DURATION. For example, if the REMAINING DURATION is "0", the COST TO DATE may only be 95% of the ACTIVITY COST. This difference may be used to reflect 5% retainage for punch list items. [Usage note: Systems implement cost information in different ways. It is recommended that users carefully review SDEF documentation and test results to determine how to ensure that SDEF data is exported correctly.]

6.h.(8) The STORED MATERIAL field contains the value of the material that the Contractor has paid for and is on site or in secure storage areas that is a portion of the COST TO DATE. An example of a number in this format is "111111111.11". If decimal places are not needed, this field shall still contain a ".00" in the last three columns of this field. [Usage note: Systems implement the stored materials field in a variety of ways. Many systems do not enforce STORED MATERIAL + COST TO DATE < ACTIVITY COST. To avoid potential confusion between systems, it is recommended that new activities be added to a schedule to reflect the cost of large equipment procurement rather than use the STORED MATERIALS field.]

6.h.(9) The EARLY START DATE indicates the earliest date possible that an activity can start as calculated by a CPM scheduling system or other Contracting Officer approved planning method. If the progress record for an activity contains an ACTUAL START DATE, then this field shall be blank.

6.h.(10) The EARLY FINISH DATE indicates the earliest date possible that an activity can finish as calculated by a CPM scheduling system or other Contracting Officer approved planning method. If the progress record for an activity contains an ACTUAL FINISH DATE, then this field shall be blank.

6.h.(11) The LATE START DATE indicates the latest date that an activity can begin as calculated by a CPM scheduling system or other Contracting Officer approved planning method. If the progress record for an activity contains an ACTUAL START DATE, then this field shall be blank.

6.h.(12) The LATE FINISH DATE indicates the latest date that an activity can finish as calculated by a CPM scheduling system or other Contracting Officer approved planning method. If the progress record for an activity contains an ACTUAL FINISH DATE, then this field shall be blank.

6.h.(13) The FLOAT SIGN indicates whether the float time calculated using a CPM scheduling system or other Contracting Officer approved planning method, is positive or negative in nature. If the progress record for an activity contains an ACTUAL FINISH DATE, then this field shall be blank. In the case of zero float this field shall be blank.

6.h.(14) The TOTAL FLOAT indicates the total float time. In the Precedence Diagram Method (PDM), the total float is the difference between the early and late start or finish dates. In the Arrow Diagram Method (ADM), the total float is equal to the late event time at the end of the activity, minus the sum of the early event time at the start of the activity plus the duration of the activity.

6.i. Project End Record: The Project End Record shall be used to identify that the data file is completed. If the ASCII End of File character is encountered, then data import programs shall use that character to infer that the data continues on the next disk. The user shall then be prompted for the next disk number, based on the VOLM record data. The Project End Record shall be the last record of the entire data file, and shall have the following format:

Description	Column Position	Max. Len.	Req. Value	Type	Notes
RECORD IDENTIFIER	1-3	3	END	Fixed	Filled

6.i.(1) The RECORD IDENTIFIER for the Project End Record shall be "END". Data contained in the data exchange file that occurs after this record shall not be used.

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SECTION 01330

SUBMITTAL PROCEDURES

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SECTION 01330

SUBMITTAL PROCEDURES

PART 1 GENERAL

1.1 SUBMITTAL IDENTIFICATION

Submittals required are identified by SD numbers and titles as follows:

SD-01 Preconstruction Submittals

SD-02 Shop Drawings

SD-03 Product Data

SD-06 Test Reports

SD-07 Certificates

1.2 SUBMITTAL CLASSIFICATION

Submittals are classified as follows:

1.2.1 Government Approved/Accepted

Governmental approval/acceptance is required for any deviations from the Solicitation or Accepted Proposal and other items as designated by the Contracting Officer. Within the terms of the Contract Clause entitled "Specifications and Drawings for Construction", they are considered to be "shop drawings". The Contractor shall provide the Government with six (6) copies of all Government Approved/Accepted construction submittals.

1.2.2 Information Only

All submittals not requiring Government acceptance/approval will be for information only. They are not considered to be "shop drawings" within the terms of the Contract Clause referred to above. The Contractor shall provide the Government with four (4) copies of all Information Only submittals.

1.3 GOVERNMENT RESPONSIBILITY

1.3.1 Extensions of Design

Government review is required for extensions of design construction submittals used to define contract conformity, and for deviation from the completed design. Review will be only for conformance with the contract requirements. Included are only those construction submittals for which the Designer of Record design documents do not include enough detail to ascertain contract compliance. Government review is not required for extensions of design such as structural steel or reinforcement shop drawings.

1.3.2 Government Accepted/Approved Submittals

The Contracting Officer's conformance review or approval of submittals shall not be construed as a complete check, but will indicate only that the design, general method of construction, materials, detailing and other information appear to meet the Solicitation and Accepted Proposal. Government review or approval will not relieve the Contractor of the responsibility for any errors that may exist. The Contractor, under the Design and CQC requirements of this contract, is responsible for the design, dimensions, all design extensions, such as the design of adequate connections and details, etc., and the satisfactory construction of all work. After submittals have been reviewed for conformance or accepted/approved, as applicable, by the Contracting Officer, no resubmittal for the purpose of substituting materials or equipment will be considered unless accompanied by an explanation of why a substitution is necessary.

1.4 CONTRACTOR RESPONSIBILITY

1.4.1 Designer of Record

The Designer of Record shall approve all extensions of design, critical materials, any deviations from the solicitation, the accepted proposal, the completed design, equipment whose compatibility with the entire system must be checked, and other items as designated by the Contracting Officer. Within the terms of the Contract Clause entitled "Specifications and Drawings for Construction", these are considered to be "shop drawings". The Government may review Designer of Record approved submittals for conformance to the Solicitation and Accepted Proposal. The Government will review all submittals designated as deviating from the Solicitation or Accepted Proposal, as described below.

1.4.2 Disapproved Submittals

The Contractor shall make all corrections required by the Contracting Officer, obtain the Designer of Record's approval, when applicable, and promptly furnish a corrected submittal in the form and number of copies specified for the initial submittal. Any "information only" submittal found to contain errors or unapproved deviations from the Solicitation or Accepted Proposal shall be resubmitted as one requiring "approval" action, requiring both Designer of Record and Government acceptance/approval. If the Contractor considers any correction indicated by the Government on the submittals to constitute a change to the contract, it shall promptly provide a notice in accordance with the Contract Clause "Changes" to the Contracting Officer.

1.5 WITHHOLDING OF PAYMENT

No payment for materials incorporated in the work will be made if all required Designer of Record or Government acceptances/approvals have not been obtained. No payment will be made for any materials incorporated into the work for any conformance review submittals or information only submittals found to contain errors or deviations from the Solicitation or Accepted Proposal.

1.6 SUBMITTALS

Government acceptance/approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. The following shall be submitted in accordance with this section:

SD-01 Preconstruction Submittals

Submittal Register (ENG Form 4288); G.
Monthly Updates (ENG Form 4288)

Four copies of the completed ENG Form 4288.

One copy of the monthly update shall be submitted together with the monthly progress payment request.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

3.1 GENERAL

The Contractor shall make submittals as required by the specifications. The Contracting Officer may request submittals in addition to those specified when deemed necessary to adequately describe the work covered in the respective sections. Units of weights and measures used on all submittals shall be the same as those used in the contract drawings. Each submittal shall be complete and in sufficient detail to allow ready determination of compliance with contract requirements. Prior to submittal, all items shall be checked and approved by the Contractor's Quality Control (CQC) System Manager and each item shall be stamped, signed, and dated by the CQC System Manager indicating action taken. Proposed deviations from the contract requirements shall be clearly identified. Submittals shall include items such as: Contractor's, manufacturer's, or fabricator's drawings; descriptive literature including (but not limited to) catalog cuts, diagrams, operating charts or curves; test reports; test cylinders; samples; O&M manuals (including parts list); certifications; warranties; and other such required submittals. Submittals requiring Government acceptance/approval shall be scheduled and made prior to the acquisition of the material or equipment covered thereby. Samples remaining upon completion of the work shall be picked up and disposed of in accordance with manufacturer's Material Safety Data Sheets (MSDS) and in compliance with existing laws and regulations.

3.1.1 Design Submittals

The Contractor shall provide design submittals in accordance with Section 01012 entitled "DESIGN AFTER AWARD".

3.2 SUBMITTAL REGISTER (ENG FORM 4288)

The Designers of Record shall develop a complete list of submittals required during the design and construction phases of the contract. The Contractor shall develop a Submittal Register, ENG Form 4288, from this list, including any other submittals that may be required by other parts of the contract. The Contractor shall use the government-provided software, QCS (see Section 01320 QUALITY CONTROL SYSTEM (QCS), to create the ENG Form 4288. The completed Submittal Register shall be submitted to the Contracting Officer for approval within 15 calendar days after Notice to Proceed with the design phase. The submit dates and need dates in the submittal register shall be coordinated with the dates in the Contractor's progress schedule. Monthly Updates (ENG Form 4288) to the submittal register showing the Contractor action codes and actual submittal dates with Government action codes and action dates shall be submitted monthly together with the monthly payment request, or until all submittals have been satisfactorily completed. When the progress schedule is revised, the submittal register shall also be revised and both resubmitted for approval. The approved submittal register will serve as a scheduling document for submittals and will be used to control submittal actions throughout the contract period.

3.3 SCHEDULING

Submittals covering component items forming a system or items that are interrelated shall be scheduled to be coordinated and submitted concurrently. Certifications to be submitted with the pertinent drawings shall be so scheduled. Adequate time (for design submittals, see Section 01012 DESIGN AFTER AWARD; for construction submittals, a minimum of 30 calendar days exclusive of mailing time) shall be allowed and shown on the register for review and approval by the Government. No delay damages or time extensions will be allowed for time lost in incorrect, incomplete and/or late submittals. An additional 15 calendar days shall be allowed and shown on the register for review and approval of submittals for refrigeration and HVAC control systems.

3.4 TRANSMITTAL FORM (ENG FORM 4025)

A transmittal form (ENG Form 4025) shall be used for submitting both Government approved and information only submittals. The Contractor shall use the government-provided software, QCS (see Section 01312 QUALITY CONTROL SYSTEM QCS), to create the ENG Form 4025. A separate transmittal form shall be used for each specification section. This form shall be properly completed by filling out all the heading blank spaces and identifying each item submitted. Special care shall be exercised to ensure proper listing of the specification paragraph and/or sheet number of the contract drawings pertinent to the data submitted for each item.

3.5 SUBMITTAL PROCEDURE

Submittals shall be made as follows:

3.5.1 Procedures

Submittals to the Contracting Officer are required in the number of copies identified in paragraph SUBMITTAL CLASSIFICATION and shall be submitted as follows:

U.S. Army Corps of Engineer District, Honolulu
Fort Shafter Resident Office
Bldg 230
Fort Shafter, Hawaii 96858-5440

3.5.2 Deviations

a. For submittals that include proposed deviations requested by the Contractor, the column "variation" on ENG Form 4025 shall be checked. The Contractor shall set forth in writing the reason for any deviations and annotate such deviations on the submittal. The Contractor's Designer of Record approval is required for any proposed deviations. The Government reserves the right to rescind inadvertent approval of submittals containing unnoted deviations.

b. In cases where "trade names or equal" are used in the plans and/or Technical Specifications, any "equal" substitution by the Contractor is considered a variance and will require the Government's approval. Approval action by the Contracting Officer will not relieve the Contractor of his quality control responsibility and compliance with the contract, except for those specific portions of the submittal which clearly highlight the departures from the contract, and which are brought to the attention of the Government. The Contractor shall be responsible for all corrective actions, when submittals containing provisions of non-compliance with the contract are not specifically brought to the Government's attention. Any associated cost or time loss from such corrective actions shall not be made subject to a claim against the Government.

c. Variations from the contract requirements may require an appropriate contract modification prior to acceptance by the Government; however, such pending action shall not be a basis of claim for time or additional cost against the Government, since the Contractor still has the option to comply with the original contract requirements. If the variation is of a minor nature and does not affect a change in cost or time of performance, a modification may not be issued. All variations shall meet the standards set by the contract documents.

3.6 COORDINATION OF LAYOUTS

The Contractor Quality Control (CQC) organization is responsible for insuring that the shop drawings and submittals of the different trades are coordinated in order that space conflicts during installation/construction of mechanical, electrical, architectural, civil, structural and other items of work are avoided. The Contractor shall be required to prepare/develop coordinated working layout drawings prior to commencement of any feature of work, at any contractor tier, unless otherwise directed by the Contracting Officer. These layout drawings shall be reviewed and certified by the CQC organization prior to the start of work in any area. The CQC shall insure that layout drawings indicate all necessary features of work, providing for a coordinated arrangement of the various installations, giving full consideration for access to installed equipment/systems and the future maintenance of these items. Interference between equipment and systems or construction materials which cannot be resolved between Contractor and subcontracting tiers shall be resolved by the Contracting Officer at no additional cost to the Government, if it is determined that adequate space was available and installations could have been accommodated within the designated construction area through properly coordinated layout drawings. One (1) CQC certified copy of all layout drawings shall be available for Government's review five (5) working days prior to scheduled commencement of the work. Submission shall be made upon Government's request.

3.7 CONTROL OF SUBMITTALS

The Contractor shall carefully control his procurement operations to ensure that each individual submittal is made on or before the Contractor scheduled submittal date shown on the approved "Submittal Register."

3.8 GOVERNMENT ACCEPTED/APPROVED SUBMITTALS

Upon completion of review of submittals requiring Government approval, the submittals will be identified as having received approval by being so stamped and dated. The Contracting Officer will retain four (4) copies of the submittal and two (2) copies of the submittal will be returned to the Contractor. If the Government performs a conformance review of other Designer of Record approved submittals, the submittals will be so identified and returned, as described above.

3.9 INFORMATION ONLY SUBMITTALS

Submittals provided For Information Only (FIO) to the Government shall be submitted in four (4) copies, including resubmittals. Normally submittals for information only will not be returned. Approval of the Contracting Officer is not required on information only submittals. The Government reserves the right to require the Contractor to resubmit any item found not to comply with the contract. This does not relieve the Contractor from the obligation to furnish material conforming to the plans and specifications; will not prevent the Contracting Officer from requiring removal and replacement of nonconforming material incorporated in the work; and does not relieve the Contractor of the requirement to furnish samples for testing by the Government laboratory or for check testing by the Government in those instances where the technical specifications so prescribe.

3.10 STAMPS

Stamps used by the Contractor on the submittal data to certify that the submittal meets contract requirements shall be similar to the following:

CONTRACTOR

(Firm Name)

_____ Approved

_____ Approved with corrections as noted on submittal data and/or attached sheets(s).

SIGNATURE: ____________________

TITLE: (DESIGNER OF RECORD)

DATE: ____________________

-- End of Section --

SUBMITTAL REGISTER

CONTRACT NO.
KNMD 01-3002A1

TITLE AND LOCATION
UPGRADE ELECTRICAL DISTRIBUTION SYSTEM, PH. 1, HICKAM AFB, HI

CONTRACTOR

ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAGRAPH #	CLASSIFICATION	GOVT OR A/E REVWR	CONTRACTOR: SCHEDULE DATES SUBMIT	APPROVAL NEEDED BY	MATERIAL NEEDED BY	CONTRACTOR ACTION: ACTION CODE	DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	APPROVING AUTHORITY: DATE FWD TO OTHER REVIEWER	DATE RCD FROM OTH REVIEWER	ACTION CODE	DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
(a)	(b)	(c)	(d)	(e)	(f)		(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		01320	SD-01 Preconstruction Submittals															
			Preliminary Project Schedule	3.4.1	G													
			Initial Project Schedule	3.4.2	G													
			Periodic Schedule Updates	3.4.3	G													
			SD-06 Test Reports															
			Narrative Report	3.5.2														
			Schedule Reports	3.5.4														
			SD-07 Certificates															
			Qualifications	1.3	G													
		01330	SD-01 Preconstruction Submittals															
			Submittal Register (ENG Form	3.2	G													
			4288)															
			Monthly Updates (ENG Form	3.2														
			4288)															
		01430	SD-06 Test Reports															
			Environmental Protection Plan	1.2.2	G													
		01451	SD-01 Preconstruction Submittals															
			Quality Control Plan	3.2	G													
		01525	SD-01 Preconstruction Submittals															
			Accident Prevention Plan (APP)	1.8	G													
			Activity Hazard Analysis (AHA)	1.9	G													
			SD-06 Test Reports															
			Reports	1.13														
			Accident Reports	1.13.1														
			Monthly Exposure Reports	1.13.3														

SUBMITTAL REGISTER

CONTRACT NO.
KNMD 01-3002A1

TITLE AND LOCATION
UPGRADE ELECTRICAL DISTRIBUTION SYSTEM, PH. 1, HICKAM AFB, HI

CONTRACTOR

ACTIVITY NO	TRANSMITTAL NO	SPEC SECT	DESCRIPTION ITEM SUBMITTED	PARAGRAPH #	CLASSIFICATION / GOVT OR A/E REVWR	CONTRACTOR: SCHEDULE DATES — SUBMIT	CONTRACTOR: SCHEDULE DATES — APPROVAL NEEDED BY	CONTRACTOR: SCHEDULE DATES — MATERIAL NEEDED BY	CONTRACTOR ACTION — ACTION CODE	CONTRACTOR ACTION — DATE OF ACTION	DATE FWD TO APPR AUTH/ DATE RCD FROM CONTR	APPROVING AUTHORITY — DATE FWD TO OTHER REVIEWER	APPROVING AUTHORITY — DATE RCD FROM OTH REVIEWER	APPROVING AUTHORITY — ACTION CODE	APPROVING AUTHORITY — DATE OF ACTION	MAILED TO CONTR/ DATE RCD FRM APPR AUTH	REMARKS
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)	(o)	(p)	(q)	(r)
		01525	Regulatory Citations and	1.13.4													
			Violations														
		01780	SD-02 Shop Drawings														
			As-Built Drawings	1.2.1													
			SD-03 Product Data														
			As-Built Record of Equipment and	1.2.2													
			Materials														
			Warranty Management Plan	1.3.1													
			Warranty Tags	1.3.5													
			Final Cleaning	1.5													
		01900	SD-01 Preconstruction Submittals														
			Organization Plan	1.3.2	G												
			Accident Prevention Plan	1.3.7.2													
			Activity Hazard Analysis	1.3.7.3	G												
			SD-03 Product Data														
			Equipment Data														
			Recovered Material Report														
			SD-06 Test Reports														
			Inspection of Existing Conditions														
			Dust Control	1.5	G												
			Excavation/Trenching Clearance														
			Condition of Contractor's														
			Operation or Storage Area														
			SD-07 Certificates														
			Products Containing Recovered	1.14													
			Materials														

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DIVISION 01 - GENERAL REQUIREMENTS

SECTION 01430

ENVIRONMENTAL PROTECTION

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SECTION 01430

ENVIRONMENTAL PROTECTION

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

CODE OF FEDERAL REGULATIONS (CFR)

40 CFR 122	EPA Administered Permit Programs: The National Pollutant Discharge Elimination System

STATE OF HAWAII DEPARTMENT OF HEALTH (HIDOH)

HIDOH, Chapter 11-43	Administrative Rules, Community Noise Control
HIDOH, Chapter 11-54	Water Quality Standards
HIDOH, Chapter 11-55	Water Pollution Control
HIDOH, Chapter 11-59	Administrative Rules, Ambient Air Quality Standards
HIDOH, Chapter 11-60	Administrative Rules, Air Pollution Control

1.2 GENERAL REQUIREMENTS

This section covers prevention of environmental pollution and damage as the result of construction operations under this contract and for those measures set forth in the TECHNICAL REQUIREMENTS. For the purpose of this specification, environmental pollution and damage is defined as the presence of chemical, physical, or biological elements or agents which adversely affect human health or welfare; unfavorably alter ecological balances of importance to human life; affect other species of importance to man; or degrade the utility of the environment for aesthetic, cultural and/or historical purposes. The control of environmental pollution and damage requires consideration of air, water, and land, and includes management of visual aesthetics, noise, solid waste, radiant energy and radioactive materials, as well as other pollutants.

1.2.1 Subcontractors

Assurance of compliance with this section by subcontractors will be the responsibility of the Contractor.

1.2.2 Notification

The Contractor is responsible for all regulator notification requirements in accordance with Federal, State and local regulations. The Contractor shall forward copies to the Contracting Officer prior to commencement of the work activities. Typically, regulatory notifications must be provided for the following (this listing is not all inclusive): demolition, renovation, NDPES defined site work, remediation of controlled substances (asbestos, hazardous waste, lead paint).

The Contracting Officer will notify the Contractor in writing of any observed noncompliance with the aforementioned Federal, State or local laws or regulations, permits, and other elements of the Contractor's environmental protection plan. The Contractor shall, after receipt of such notice, inform the Contracting Officer of proposed corrective action and take such action as may be approved. If the Contractor fails to comply promptly, the Contracting Officer may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No time extensions will be granted or costs or damages allowed to the Contractor for any such suspension.

1.3 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-06 Test Reports

Environmental Protection Plan; G.

Within 30 calendar days of receipt of Notice to Proceed, the Contractor shall submit in writing an environmental protection plan. Approval of the Contractor's plan will not relieve the Contractor of his responsibility for adequate and continuing control of pollutants and other environmental protection measures. The environmental protection plan shall include but not be limited to the following:

a. A list of Federal, State, and local laws, regulations, and permits concerning environmental protection, pollution control and abatement that are applicable to the Contractor's proposed operations and the requirements imposed by those laws, regulations, and permits.

b. Methods for protection of features to be preserved within authorized work areas. The Contractor shall prepare a listing of methods to protect resources needing protection; i.e., trees, shrubs, vines, grasses and ground cover, landscape features, air and water quality, wildlife, soil, historical, archeological, and cultural resources.

c. Procedures to be implemented to provide the required environmental protection and to comply with the applicable laws and regulations. The Contractor shall set out the procedures to be followed to correct pollution of the environment due to accident, natural causes, or failure to follow the procedures set out in accordance with the environmental protection plan.

d. Location of the solid waste disposal area.

e. Drawings showing locations of any proposed temporary excavations or embankments for haul roads, material storage areas, structures, sanitary facilities, and stockpiles of excess or spoil materials.

f. Environmental monitoring plans for the job site, including land, water, air, and noise monitoring.

g. Traffic control plan.

h. Methods of protecting surface and ground water during construction activities.

i. Work area plan showing the proposed activity in each portion of the area and identifying the areas of limited use or nonuse. Plan should include measures for marking the limits of use areas.

j. Training for his personnel during the construction period.

k. Health and Safety Plan

PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 EXECUTION

3.1 PROTECTION OF ENVIRONMENTAL RESOURCES

The environmental resources within the project boundaries and those affected outside the limits of permanent work under this contract shall be protected during the entire period of this contract. The Contractor shall confine his activities to areas defined by the drawings and specifications.

3.1.1 Land Resources

Prior to the beginning of any construction, the Contractor shall identify all land resources to be preserved within the Contractor's work area. Except in areas indicated on the drawings or specified to be cleared, the Contractor shall not remove, cut, deface, injure, or destroy land resources including trees, shrubs, vines, grasses, topsoil, and land forms without special permission from the Contracting Officer. No ropes, cables, or guys shall be fastened to or attached to any trees for anchorage unless specifically authorized. Where such special emergency use is permitted, the Contractor shall provide effective protection for land and vegetation resources at all times as defined in the following subparagraphs.

3.1.1.1 Work Area Limits

Prior to any construction, the Contractor shall mark the areas that are not required to accomplish all work to be performed under this contract. Isolated areas within the general work area which are to be saved and protected shall also be marked or fenced. Monuments and markers shall be protected before construction operations commence. Where construction operations are to be conducted during darkness, the markers shall be visible. The Contractor shall convey to his personnel the purpose of marking and/or protection of all necessary objects.

3.1.1.2 Protection of Landscape

Trees, shrubs, vines, grasses, land forms and other landscape features indicated and defined on the drawings to be preserved shall be clearly identified by marking, fencing, or wrapping with boards, or any other approved techniques.

3.1.1.3 Contractor Facilities and Work Areas

a. Location of Field Offices, Storage, and Other Contractor Facilities: The Contractors' field offices, staging areas, stockpile storage, and temporary buildings shall be placed in areas designated on the drawings or as directed by the Contracting Officer. Temporary movement or relocation of Contractor facilities shall be made only on approval by the Contracting Officer.

3.1.2 Disposal of Wastes

Disposal of wastes shall be as specified in Section 01900 MISCELLANEOUS PROVISIONS and as specified hereinafter.

3.1.2.1 Solid Wastes

Solid wastes (excluding clearing debris) shall be placed in containers which are emptied on a regular schedule. All handling and disposal shall be conducted to prevent contamination. Segregation measures shall be employed such that no hazardous or toxic waste will become commingled with solid waste. The Contractor shall transport all solid waste off Government property and dispose of it in compliance with Federal, State, and local requirements for solid waste disposal. The Contractor shall comply with site procedures and with Federal, State, and local laws and regulations pertaining to the use of landfill areas.

3.1.2.2 Chemical Wastes:

Chemical wastes shall be stored in corrosion resistant containers, removed from the work area and disposed of in accordance with Federal, State, and local laws and regulations.

3.1.2.3 Hazardous Wastes:

The Contractor shall take sufficient measures to prevent spillage of hazardous and toxic materials during dispensing and shall collect waste in suitable containers observing compatibility. The Contractor shall transport all hazardous waste off Government property and dispose of it in compliance with Federal and local laws and regulations. Spills of hazardous or toxic materials shall be immediately reported to the Contracting Officer. Cleanup and cleanup costs due to spills shall be the responsibility of the Contractor.

3.1.3 Air Resources

The Contractor shall keep construction activities under surveillance, management and control to minimize pollution of air resources. All activities, equipment, processes, and work operated or performed by the Contractor in accomplishing the specified construction shall be in strict accordance with HIDOH, Chapter 11-59, HIDOH, Chapter 11-60, and all Federal emission and performance laws and standards. Ambient Air Quality Standards set by the Environmental Protection Agency shall be maintained for those construction operations and activities specified in this section. Special management techniques as set out below shall be implemented to control air pollution by the construction activities which are included in the contract.

3.1.3.1 Particulates

a. Dust particles, aerosols, and gaseous by-products from all construction activities, processing and preparation of materials, such as from asphaltic batch plants, shall be controlled at all times, including weekends, holidays and hours when work is not in progress.

b. The Contractor shall maintain all excavations, stockpiles, haul roads, permanent and temporary access roads, plant sites and all other work areas within or outside the project boundaries free from particulates which would cause the air pollution standards mentioned in paragraph Air Resources, herein before, to be exceeded or which would cause a hazard or a nuisance. Sprinkling, chemical treatment of an approved type, light bituminous treatment, baghouse, scrubbers, electrostatic precipitators or other methods will be permitted to control particulates in the work area. Sprinkling, to be efficient, must be repeated at such intervals as to keep the disturbed area damp at all times. The Contractor must have sufficient competent equipment available to accomplish this task. Particulate control shall be performed as the work proceeds and whenever a particulate nuisance or hazard occurs.

3.1.3.2 Hydrocarbons and Carbon Monoxide

Hydrocarbons and carbon monoxide emissions from equipment shall be controlled to Federal and State allowable limits at all times.

3.1.3.3 Odors

Odors shall be controlled at all times for all construction activities, processing and preparation of materials.

3.1.3.4 Monitoring of Air Quality

Monitoring of air quality shall be the responsibility of the Contractor. All air areas affected by the construction activities shall be monitored by the Contractor.

3.1.4 Sound Intrusions

The Contractor shall keep construction activities under surveillance, and control to minimize damage to the environment by noise. The Contractor shall comply with the provisions of HIDOH, Chapter 11-43.

3.2 POST CONSTRUCTION CLEANUP

The Contractor shall clean up area(s) used for construction.

3.3 RESTORATION OF LANDSCAPE DAMAGE

The Contractor shall restore all landscape features damaged or destroyed during construction operations outside the limits of the approved work areas. Such restoration shall be in accordance with the plan submitted for approval by the Contracting Officer. This work will be accomplished at the Contractor's expense.

3.4 MAINTENANCE OF POLLUTION CONTROL FACILITIES

The Contractor shall maintain all constructed facilities and portable pollution control devices for the duration of the contract or for that length of time construction activities create the particular pollutant.

3.5 TRAINING OF CONTRACTOR PERSONNEL IN POLLUTION CONTROL

The Contractor shall train his personnel in all phases of environmental protection. The training shall include methods of detecting and avoiding pollution, familiarization with pollution standards, both statutory and contractual, and installation and care of facilities (vegetative covers, and instruments required for monitoring purposes) to ensure adequate and continuous environmental pollution control.

3.6 NPDES PERMIT REQUIREMENTS

40 CFR 122: EPA Administered Permit Prorams: The National Pollutant Discharge Elimination System

3.6.1 Contractor Responsibilities

Hickam Air Force Base filed Notice of Intent (NOI) Form G (construction activity dewatering effluent) with the State DOH Clean Water Branch. It is anticipated that conditional Notices of General Permit Coverage (NGPCs) will be granted prior to project award. The conditional NGPCs will require that additional information be submitted to HIDOH prior to site activities covered by the NGPCs.

The contractor is responsible for meeting the requirements of the NGPCs during construction activities at the site and for complying with the provisions contained in the HIDOH, Chapter 11-54 Hawaii Administrative Rules (HAR), Title 11, Chapter 54 Water Quality Standards, and HIDOH, Chapter 11-55 Chapter 55 Water Pollution Control.

The contractor shall provide any additional information requested by the NGPC, as well as contractor-specific information not available at the time of preparation of the NOIs (specified below). The contractor shall submit the required information to the HIDOH Clean Water Branch at least 30 days prior to site activities requiring coverage by each NGPC.

3.6.2 NOI Form G (Construction Activity Dewatering Effluent)

3.6.2.1 Contractor Submittal of Information

The contractor is responsible for reviewing the submitted NOI Form G and the conditional NGPC. The Contractor shall make any revisions to the submitted NOI information appropriate for their planned work at the site, and shall also provide additional information requested by the conditional NGPC. The Contractor shall follow the recommendations regarding construction dewatering contained in the project geotechnical report when developing the dewatering design. The contractor shall submit the following information, to complete the NOI Form G, to the HIDOH Clean Water Branch at least 30 days prior to beginning construction dewatering activities:

a. Form G, Item 3. General Contractor Information. Contractor shall provide information requested.

b. Form G, Item 6. Dewatering Discharge Information. The Contractor shall provide the following information: anticipated quantity of discharge, anticipated rate of discharge, and frequency of discharge.

c. Form G, Item 7. Location Map. Item d. The Contractor shall update the location map provided with the NOI to show where the water quality sample was collected.

d. Form G, Item 13. Project Description.

Item c. Construction Schedule. The Contractor shall provide a construction schedule. The Contractor may submit a preliminary schedule, and provide updates to DOH as they become available.

Item d. The time frame of the proposed discharges. The Contractor shall provide information on timing of dewatering discharges. The Contractor may submit a preliminary schedule, and provide updates to DOH as they become available.

e. Form G, Item 14. Physical Source Water Quality. The contractor shall note whether the dewatering effluent is anticipated to contain floating debris, scum or foam, color, or odor.

f. Form G, Item 15. Water Quality Parameters.

Item a. Parameters must be tested and reported.
The Contractor shall test the groundwater(or provide previously gathered data) for the following analytes: (this is the initial source water evaluation to be provided before dewatering can begin and is not related to the regular monitoring required by the NGPC) total nitrogen, ammonia nitrogen, nitrate+nitrite, total phosphorus, turbidity, total suspended solids, pH, dissolved oxygen, oxygen saturation, temperature, salinity (or chloride or conductivity), and oil and grease.

Item b. Explanation and evaluation of source water quality data. The Contractor shall evaluate the source water quality data with respect to the water quality criteria contained in HIDOH Chapter 11-54.

g. Form G, Item 16. Toxic Parameters. The Contractor shall also test the initial source water sample for toxic parameters if these are anticipated to be present in the groundwater.

h. Form G, Item 17. Dewatering Facility Designer Information. The Contractor shall provide the information for the dewatering facility designer.

i. Form G, Item 18. Treatment Facility Designer Information. The Contractor shall provide the information for the treatment facility designer.

j. Form G, Item 19. Dewatering Plan. The Contractor shall provide a dewatering plan that contains, at a minimum, the following information:

i. the pumping devices to be used, their pumping capacity, and the number of devices to be used;

ii. treatment design;
iii. design concerns;
iv. calculations used in the treatment design; and
v. proposed mitigative measures.

k. Form G, Item 20. Dewatering System Maintenance Plan. The Contractor shall provide a dewatering system maintenance plan that that contains, at a minimum, the following information:

i. schedule of activities;

ii. operation and maintenance procedure to prevent or reduce the pollution of state water, including: responsible field person of the system (by title or name); operations plan; maintenance scheduling or action criteria; maintenance program; sediment handling disposal plan; monitoring and visual inspection program; cessation of discharge plan; and effluent control plan; and

iii. Treatment requirements.

k. Form G, Item 21. Construction Pollution Prevention Plan. The Contractor shall provide a construction pollution prevention plan that that contains, at a minimum, the following information:

i. prohibited practices;

ii. other management practices to prevent or reduce the pollution of state waters; and

iii. practices to control project site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage or stockpiling area(s).

3.6.4.2 Best Management Practices

The Contractor shall use applicable Best Management Practices to prevent contaminated dewatering effluent from reaching state waters. The Contractor's Best Management Practices Plan must be submitted to the HIDOH and the Contracting Officer at least 30 days prior to the start of construction activities. The Contracting Officer may request additional or alternate treatment methods. The preferred method of treatment of dewatering effluent is recharge to adjacent excavations.

3.6.2.2 Contaminated Groundwater

Contaminated groundwater may be present in the area of project dewatering. The Contractor shall notify the Contracting Officer and 15th CEV immediately upon encountering contaminated soil or groundwater.

The Contractor shall employ a treatment method that will remove any free-phase product and visible sheen from the water prior to recharge to adjacent excavations. If free-phase petroleum product is encountered, as much of the product as possible should be recovered for reuse or disposal. Treatment methods may include, but are not limited to, use of oil-water separators, oil skimming, or absorbent pads. Under no circumstance is water with free-phase product, visible sheen, or noticeable petroleum odor to be discharged to the storm drainage system or state waters. Where visible sheen or free product is encountered during excavation, the contractor shall notify the contracting officer and the Hickam AFB Environmental Flight (15 CES/CEV) immediately. Dewatering effluent may be discharged into adjacent inactive trench sections for infiltration. If contaminated groundwater is being pumped, the infiltration trench must be within the same contamination area. The sheen or free product shall be removed by an appropriate method (i.e. absorbent pads/booms, oil/water separator, etc.) as determined by existing dewatering and subsurface conditions. A DOH-HEER Office representative will monitor sheen or free product removal activities; the Contractor must allow 48-hour notice by Hickam AFB Environmental Flight (15 CES/CEV) to DOH-HEER representative before commencing such activities.

3.6.4.4 Worker Protection

The Contractor shall provide appropriate health and safety equipment to workers who may be exposed to contaminated groundwater. Such exposure shall be covered under the Contractor's Health and Safety Plan, which shall include, at a minimum:

a. a description of the work and potential hazards;

b. training requirements for Contractor personnel;

c. determination of the need for personal protective equipment (PPE) in performing the work;

d. measures to prevent exposure of personnel to hazardous conditions; and

e. exposure and emergency response measures.

-- End of Section --

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DIVISION 01 - GENERAL REQUIREMENTS

SECTION 01451

CONTRACTOR QUALITY CONTROL

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SECTION 01451

CONTRACTOR QUALITY CONTROL

PART 1 GENERAL

1.1 REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 3740	(1996) Minimum Requirements for Agencies Engaged in the Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction
ASTM E 329	(1995b) Agencies Engaged in the Testing and/or Inspection of Materials Used in Construction

1.2 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Quality Control Plan; G.

1.3 PAYMENT

Separate payment will not be made for providing and maintaining an effective Quality Control system, and all costs associated therewith shall be included in the applicable unit prices or lump-sum prices contained in the Bidding Schedule.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION

3.1 GENERAL

The Contractor is responsible for quality control and shall establish and maintain an effective quality control system in compliance with the Contract Clause titled, "Inspection of Construction." The quality control system shall consist of plans, procedures, and the organization necessary to produce an end product that complies with the contract requirements.

The system shall cover all design and construction operations, both onsite and offsite, and shall be keyed to the proposed design and construction sequence.

The Project Manager will be held responsible for the quality of work on the job and is subject to removal by the Contracting Officer for non-compliance with quality requirements specified in the contract. The Project Manager in this context shall mean the individual with the responsibility for the overall management of the project, including design, construction, quality, and production.

3.2 QUALITY CONTROL PLAN

3.2.1 Contractor Quality Control

The Contractor shall furnish for review by the Government, not later than 30 days after receipt of Notice to Proceed, the Contractor Quality Control (CQC) Plan proposed to implement the requirements of the Contract Clause titled "Inspection of Construction." The plan shall identify personnel, procedures, control, instructions, test, records, and forms to be used. The Government will consider an interim plan for the first 90 days of operation. Design and construction will be permitted to begin only after acceptance of the CQC Plan or acceptance of an interim plan applicable to the particular feature of work to be started. Work outside of the features of work included in an accepted interim plan will not be permitted to begin until acceptance of a CQC Plan or another interim plan containing the additional features of work to be started.

3.2.2 Content of the CQC Plan

The CQC Plan shall include, as a minimum, the following to cover all design and construction operations, both onsite and offsite, including work by subcontractors, designers of record, consultants, architect/engineers (A/E), fabricators, suppliers, and purchasing agents:

a. A description of the quality control organization, including a chart showing lines of authority and acknowledgment that the CQC staff shall implement the three phase control system for all aspects of the construction work specified. The staff shall include a CQC System Manager who shall report to the Project Manager or someone higher in the Contractor's organization.

b. The name, qualifications (in resume format), duties, responsibilities, and authorities of each person assigned a CQC function. Technicians responsible for sampling and testing of concrete shall be certified by the American Concrete Institute (ACI) or the Concrete Technicians Association of Hawaii (CTAH). Proof of certification shall be included in the quality control Plan. Personnel qualifications may be furnished incrementally as the work progresses, but in no case, less than fourteen (14) calendar days before personnel are required on the job.

c. A copy of the letter to the CQC System Manager signed by an authorized official of the firm which describes the responsibilities and delegates sufficient authorities to adequately perform the functions of the CQC System Manager, including authority to stop work which is not in compliance with the contract. The CQC System Manager shall issue letters of direction to all other various quality control representatives outlining duties, authorities, and responsibilities. Copies of these letters shall also be furnished to the Government.

d. Procedures for scheduling, reviewing, certifying, and managing submittals, including those of subcontractors, designers of record, consultants, A/E's, offsite fabricators, suppliers, and purchasing agents. These procedures shall be in accordance with Section 01330, SUBMITTAL PROCEDURES, or Section 01012, DESIGN AFTER AWARD, as applicable.

e. Control, verification, and acceptance testing procedures for each specific test to include the test name, specification paragraph requiring test, feature of work to be tested, test frequency, and person responsible for each test.

f. For all proposed QC materials testing laboratories the contractor must submit a current HED or MTC letter of validation.

g. Procedures for tracking preparatory, initial, and follow-up control phases and control, verification, and acceptance tests including documentation.

h. Procedures for tracking design and construction deficiencies from identification through acceptable corrective action. These procedures shall establish verification that identified deficiencies have been corrected.

i. Reporting procedures, including proposed reporting formats.

j. A list of the definable features of work. A definable feature of work is a task that is separate and distinct from other tasks, has separate control requirements, and may be identified by different trades or disciplines, or it may be work by the same trade in a different environment. Although each section of the specifications may generally be considered as a definable feature of work, there are frequently more than one definable feature under a particular section. This list will be agreed upon during the coordination meeting, but may also be developed as design progresses. Definable features must be identified prior to construction of that feature.

3.2.3 Additional Requirements for the Design Quality Control (DQC) Plan

The Contractor's DQC Plan shall provide and maintain an effective quality control program which will assure that all services required by this design-build contract are performed and provided in a manner that meets professional architectural and engineering quality standards. As a minimum, competent, independent reviewers identified in the DQC Plan shall technically review all documents. The same element that produced the product shall not perform the independent technical review (ITR). The Contractor shall correct errors and deficiencies in the design documents prior to submitting them to the Government.

The Contractor shall include the design schedule in the master project schedule, showing the sequence of events involved in carrying out the project tasks within the specific contract period. This should be at a detailed level of scheduling sufficient to identify all major design tasks, including those that control the flow of work. The schedule shall include review and correction periods associated with each item. This should be a forward planning as well as a project-monitoring tool. The schedule reflects calendar days and not dates for each activity. If the schedule is changed, the Contractor shall submit a revised schedule reflecting the change within seven (7) calendar days. The Contractor shall include in the DQC Plan the discipline-specific checklists to be used during the design and quality control of each submittal. These completed checklists shall be submitted at each design phase as part of the project documentation. Example checklists can be found in ER 1110-1-12.

A Design Quality Control Manager who has the responsibility of being cognizant of, and assuring that all documents on the project have been coordinated, shall implement the DQC Plan. This individual shall be a person who has verifiable engineering or architectural design experience and is a registered professional engineer or architect. The Contractor shall notify the Contracting Officer, in writing, of the name of the individual, and the name of an alternate person assigned to the position.

The Contracting Officer will notify the Contractor, in writing, of the acceptance of the DQC Plan. After acceptance, any changes proposed by the Contractor are subject to the acceptance of the Contracting Officer.

3.2.4 Acceptance of Plan

Acceptance of the Contractor's plan is required prior to the start of design and/or construction. Acceptance is conditional and will be predicated on satisfactory performance during the design and construction phases. The Government reserves the right to require the Contractor to make changes in his CQC Plan and operations including removal of personnel, as necessary, to obtain the quality specified.

3.2.5 Notification of Changes

After acceptance of the CQC Plan, the Contractor shall notify the Contracting Officer in writing a minimum of seven (7) calendar days prior to any of any proposed change. Proposed changes shall not be implemented prior to its acceptance by the Contracting Officer.

3.3 COORDINATION MEETINGS

After the Pre-design Conference and before the start of design and/or construction, and prior to acceptance by the Government of the Quality Control Plan, a Quality Control Coordination Meeting shall be held. The Contractor shall meet with the Contracting Officer or Authorized Representative to discuss the Contractor's quality control system. The CQC Plan shall be submitted for review a minimum of 7 calendar days prior to the Coordination Meeting. During this meeting, a mutual understanding of the CQC system details shall be developed, including the forms for recording the CQC operations, design activities, control activities, testing, administration of the system for both onsite and offsite work, and the interrelationship of Contractor's management and control with the Government's Quality Assurance. Minutes of the meeting will be prepared by the Government and signed by both the Contractor and the Contracting Officer's Representative. The minutes shall become a part of the contract file. There may be occasions when subsequent conferences will be called by either party to reconfirm mutual understandings and/or address deficiencies in the CQC system or procedures that may require corrective action by the Contractor.

3.4 QUALITY CONTROL ORGANIZATION

3.4.1 Personnel Requirements

The requirements for the CQC organization are a CQC System Manager (CQCSM), a Design Quality Manager, and a sufficient number of additional qualified personnel to ensure contract compliance. The Safety and Health Manager shall receive direction and authority from the CQC System Manager and shall serve as a member of the CQC staff. Personnel identified in the technical provisions as requiring specialized skills to assure the required work is being performed properly will also be included as par of the CQC organization. The Contractor's CQC staff shall maintain a presence at the site at all times during progress of the work and have complete authority and responsibility to take any action necessary to ensure contract compliance. The CQC staff shall be subject to acceptance by the Contracting Officer.

The Contractor shall provide adequate office space, filing systems and other resources as necessary to maintain an effective and fully functional CQC organization. Complete records of all letters, material submittals, shop drawing submittals, schedules and all other project documentation shall be promptly furnished to the CQC organization by the Contractor. The CQC organization shall be responsible to maintain these documents and records at the site at all times, except as otherwise acceptable to the Contracting Officer.

3.4.2 CQC System Manager

The Contractor shall identify as CQC System Manager an individual within the onsite work organization who shall be responsible for overall management of CQC on the contract and have the authority to act in all CQC matters for the Contractor. The CQC System Manager shall be a graduate engineer, graduate architect, or a graduate of construction management with a minimum of 5 years construction experience on construction similar to this contract. The CQC System Manager, or an acceptable, qualified representative, shall be on site at all times during design and construction activities and shall be employed by the prime Contractor. The CQC System Manager shall be assigned no other duties. An alternate for the CQC System Manager shall be identified in the plan to serve in the event of the System Manager's absence. The requirements for the alternate shall be the same as the designated CQC System Manager.

3.4.3 CQC Personnel (Construction)

In addition to CQC personnel specified elsewhere in the contract, the Contractor shall provide as part of the CQC organization specialized personnel to assist the CQC System Manager in the areas listed below. Unless otherwise stated, these individuals, when required, may be employees of the prime or subcontractor; shall be responsible to the CQC System Manager; be physically present at the construction site during work on their areas of responsibility; have the necessary education and/or experience in accordance with the experience matrix listed herein. These individuals may perform other duties but must be allowed sufficient time to perform their assigned quality control duties as described in the Quality Control Plan.

EXPERIENCE MATRIX

Area	Qualifications

a. Civil	Graduate Civil Engineer with 2 years experience in the type of work being performed on this project or technician with 5 years related experience
b. Electrical	Graduate Electrical Engineer with 7 years related experience
c. Structural	Graduate Structural Engineer with 2 years experience or person with 5 years related experience
d. Architectural	Graduate Architect with 2 years experience or person with 5 years related experience
e. Environmental	Graduate Environmental Engineer with 3 years experience
f. Submittals	Submittal Clerk with 1 year experience
g. Concrete, Pavements and Soils	Materials Technician with 2 years experience for the appropriate area

If it is subsequently determined by the Contracting Officer that the minimum contract CQC requirements are not being met, the Contractor may be required to provide additional staff personnel to the CQC organization at no cost to the Government.

3.4.4 Additional Requirement

In addition to the above experience and/or education requirements, the CQC System Manager and any alternates shall have completed the course entitled "Construction Quality Management For Contractors" within the past 5 years. This course is periodically offered at the General Contractors Association of Hawaii.

3.4.5 Organizational Changes

The Contractor shall maintain the CQC staff at full strength at all times. When it is necessary to make changes to the CQC staff, the Contractor shall revise the CQC Plan to reflect the changes and submit the changes to the Contracting Officer for acceptance. Requests shall include the names, qualifications, duties, and responsibilities of each proposed replacement. Upon acceptance of any changes, the Contractor shall revise the CQC plan to accurately reflect the changes. The CQC plan shall be kept current at all times during the life of the contract.

3.5 SUBMITTALS AND DELIVERABLES

Design submittals shall be made as required in Section 01012, DESIGN AFTER AWARD. Construction submittals shall be made as specified in Section 01330, SUBMITTAL PROCEDURES. The CQC organization shall be responsible for certifying that all submittals and deliverables are in compliance with the contract requirements.

3.6 CONTROL

Contractor Quality Control is the means by which the Contractor ensures that the design and construction, to include that of designers of record, consultants, subcontractors and suppliers, comply with the requirements of the contract. The CQC System Manager shall conduct at least three phases of control for each definable feature of construction work, as follows:

3.6.1 Preparatory Phase

This phase shall be performed prior to beginning work on each definable feature of work, after all required plans/documents/materials are approved/accepted, and after copies are at the work site. This phase shall include:

a. A review of each paragraph of applicable specifications, reference codes and standards. The Contractor shall make available and maintain a copy, in the field, of the referenced codes and standards applicable to the work to be accomplished, until final acceptance of the work.

b. A review of the contract drawings.

c. A check to assure that all materials and/or equipment have been tested, submitted, and approved.

d. Review of provisions that have been made to provide required control inspection and testing.

e. Examination of the work area to assure that all required preliminary work has been completed and is in compliance with the contract.

f. A physical examination of required materials, equipment, and sample work to assure that they are on hand, conform to approved shop drawings or submitted data, and are properly stored.

g. A review of the appropriate activity hazard analysis to assure safety requirements are met.

h. Discussion of procedures for controlling quality of the work including repetitive deficiencies. Document construction tolerances and workmanship standards for that feature of work.

i. A check to ensure that the Contracting Officer has accepted the portion of the plan for the work to be performed.

j. Discussion of the initial control phase.

k. The Government shall be notified at least 2 workdays in advance of beginning the preparatory control phase. This phase shall include a meeting conducted by the CQC System Manager and attended by the superintendent, other CQC personnel (as applicable), and the foreman responsible for the definable feature. The results of the preparatory phase actions shall be documented by separate minutes prepared by the CQC System Manager and attached to the daily CQC report. The Contractor shall instruct applicable workers as to the acceptable level of workmanship required in order to meet contract specifications.

3.6.2 Initial Phase

This phase shall be accomplished at the beginning of a definable feature of work. The following shall be accomplished:

a. A check of work to ensure that it is in full compliance with contract requirements. Review minutes of the preparatory meeting.

b. Verify adequacy of controls to ensure full contract compliance. Verify required control inspection and testing.

c. Establish level of workmanship and verify that it meets minimum acceptable workmanship standards. Compare with required sample panels as appropriate.

d. Resolve all differences.

e. Check safety to include compliance with and upgrading of the safety plan and activity hazard analysis. Review the activity analysis with each worker.

f. The Government shall be notified at least 1 workday in advance of beginning the initial phase. Separate minutes of this phase shall be prepared by the CQC System Manager and attached to the daily CQC report. Exact location of initial phase shall be indicated for future reference and comparison with follow-up phases.

g. The initial phase should be repeated for each new crew to work onsite, or any time acceptable specified quality standards are not being met.

3.6.3 Follow-up Phase

Daily checks shall be performed to assure control activities, including control testing, are providing continued compliance with contract requirements, until completion of the particular feature of work. The checks shall be made a matter of record in the CQC documentation. Final follow-up checks shall be conducted and all deficiencies corrected prior to the start of additional features of work that may be affected by the deficient work. The Contractor shall not build upon nor conceal non-conforming work.

3.6.3 Additional Preparatory and Initial Phases

Additional preparatory and initial phases shall be conducted on the same definable features of work if the quality of on-going work is unacceptable, if there are changes in the applicable CQC staff, onsite production supervision or work crew, if work on a definable feature is resumed after a substantial period of inactivity, or if other problems develop.

3.7 TESTS

3.7.1 Testing Procedure

The Contractor shall perform specified or required tests to verify that control measures are adequate to provide a product that conforms to contract requirements. Upon request, the Contractor shall furnish to the Government duplicate samples of test specimens for possible testing by the

Government. Testing includes operation and/or acceptance tests when specified. The Contractor shall procure the services of a Corps of Engineers approved testing laboratory or establish an approved testing laboratory at the project site. The Contractor shall perform the following activities and record and provide the following data:

The Contractor's testing procedures shall include the following activities and shall record and provide the following data:

a. Verify that testing procedures comply with contract requirements.

b. Verify that facilities and testing equipment are available and comply with testing standards.

c. Check test instrument calibration data against certified standards.

d. Verify that recording forms and test identification control number system, including all of the test documentation requirements, have been prepared.

e. Results of all tests taken, both passing and failing tests, shall be recorded on the CQC report for the date taken. Specification paragraph reference, location where tests were taken, and the sequential control number identifying the test shall be given. If approved by the Contracting Officer, actual test reports may be submitted later with a reference to the test number and date taken. An information copy of tests performed by an offsite or commercial test facility shall be provided directly to the Contracting Officer. Failure to submit timely test reports as stated may result in nonpayment for related work performed and disapproval of the test facility for this contract.

3.7.2 Testing Laboratories

3.7.2.1 Validation Requirements

Any laboratory used by the Contractor for testing aggregate, concrete, bituminous materials, soils, rock, and other construction materials must possess a current validation letter prior to performance of testing by that laboratory. Validation shall be obtained through the Corps of Engineers Materials Testing Center (MTC) in Vicksburg, MS. Validation may be initiated by completing an Inspection Request Form and questionnaire that are available directly from the MTC or from the MTC website, http://www.wes.army.mil/SL/MTC/inspection.htm.

The MTC also maintains a website listing validated laboratories at: http://www.wes.army.mil/SL/MTC/ValStatesTbl.htm.

3.7.2.2 Exception

The validation letters already obtained from HED in 2001 and 2002 will be considered acceptable proof of validation through its expiration date. Upon expiration, laboratories must be revalidated by the MTC, as required above. The validation status of laboratories in Hawaii may be found at: http://www.poh.usace.army.mil/Construction/LabValidation/labvalidation.html.

3.7.3 Capability Check

The Government reserves the right to check laboratory equipment in the proposed laboratory for compliance with the standards set forth in the contract specifications and to check the laboratory technician's testing procedures and techniques. Laboratories utilized for testing soils, concrete, asphalt, and steel shall meet criteria detailed in ASTM D 3740 and ASTM E 329.

3.7.4 Capability Recheck

If the selected laboratory fails the capability check, the Contractor shall reimburse the Government for each succeeding recheck of the laboratory or the checking of a subsequently selected laboratory. Such costs will be deducted from the contract amount due the Contractor.

3.7.5 Onsite Laboratory

The Government reserves the right to utilize the Contractor's control testing laboratory and equipment to make quality assurance tests and to check the Contractor's testing procedures, techniques, and test results at no additional cost to the Government.

3.7.6 Furnishing or Transportation of Samples for Testing

Costs incidental to the transportation of samples or materials shall be borne by the Contractor. Samples of materials for test verification and acceptance testing by the Government shall be delivered to a testing laboratory on the Island of Oahu, State of Hawaii, designated by the Contracting Officer. Coordination for each specific test, exact delivery location, and dates will be made through the Government field office.

3.8 COMPLETION INSPECTION

3.8.1 Punch-Out Inspection

Near the completion of all work or any increment thereof established by a completion time stated in the Special Clause entitled "Commencement, Prosecution, and Completion of Work," or stated elsewhere in the specifications, the CQC System Manager shall conduct an inspection of the work and develop a punch list of items which do not conform to the approved drawings and specifications. Such a list of deficiencies shall be included in the CQC documentation, as required by paragraph DOCUMENTATION below, and shall include the estimated date by which the deficiencies will be corrected. The CQC System Manager or staff shall make a second inspection to ascertain that all deficiencies have been corrected. Once this is accomplished, the Contractor shall notify the Government that the facility is ready for the Government Pre-Final inspection.

3.8.2 Pre-Final Inspection

The Government will perform this inspection to verify that the facility is complete and ready to be occupied. The CQC System Manager shall develop a punch list of items that do not conform to the contract documents. The Government will review the punch list and add to or correct the items listed. The CQC System Manager shall incorporate Government comments and provide a Pre-Final Punch List. The Contractor's CQC System Manager shall ensure that all items on this list have been corrected before notifying the Government to schedule a Final inspection with the customer. Any items noted on the Pre-Final inspection shall be corrected in a timely manner. These inspections and any deficiency corrections required by this paragraph shall be accomplished within the time slated for completion of the entire work (contract performance period) or any particular increment thereof if the project is divided into increments by separate completion dates.

3.8.3 Final Acceptance Inspection

The Contractor's Quality Control Inspection personnel, plus the superintendent or other primary management person, and the Contracting Officer's Representative shall be in attendance at this inspection. Additional Government personnel including, but not limited to, those from Base/Post Civil Facility Engineer user groups, and major commands may also be in attendance. The Contractor shall notify the Contracting Officer at least 14 days prior to the proposed final acceptance inspection and shall include the Contractor's assurance that all specific items previously identified to the Contractor as being unacceptable, along with all remaining work to be performed under the contract, will be complete and acceptable by the date scheduled for the final acceptance inspection. The final acceptance inspection will be formally scheduled by the Contracting Officer based upon results of the Pre-Final inspection. Failure of the Contractor to have all contract work acceptably complete for this inspection will be cause for the Contracting Officer to bill the Contractor for the Government's additional inspection cost in accordance with the contract clause titled "Inspection of Construction".

3.8.4 Post Completion Feedback Meeting and Preparation of Written Minutes

At the completion of this project, the CQC Systems Manager will host a meeting to review the project and to discuss lessons learned during the design and construction of the project. This meeting should be scheduled for 4 hours on?site and should be attended by the Project Manager and representatives of the designers of record, consultants, and major subcontractors, including mechanical and electrical. The Contracting Officer will invite members of the design team to participate in this meeting. Minutes of the meeting shall be prepared by the CQC System Manager and submitted to the Government.

3.9 DOCUMENTATION

The Contractor shall maintain current records providing factual evidence that required quality control activities and/or tests have been performed. These records shall include the work of subcontractors and suppliers and shall be prepared using government-provided software, QCS (see Section 01312 01312 QUALITY CONTROL SYSTEM (QCS)), that includes, as a minimum, the following information:

a. Contractor/subcontractor and their area of responsibility.

b. Operating plant/equipment with hours worked, idle, or down for repair.

c. Work performed each day, giving location, description, and by whom. When Network Analysis (NAS) is used, identify each phase of work performed each day by NAS activity number.

d. Test and/or control activities performed with results and references to specifications/drawings requirements. The control phase should be identified (Preparatory, Initial, Follow-up). List deficiencies noted along with corrective action.

e. Quantity of materials received at the site with statement as to acceptability, storage, and reference to specifications/ drawings requirements.

f. Submittals reviewed, with contract reference, by whom, and action taken.

g. Off-site surveillance activities, including actions taken.

h. Job safety evaluations stating what was checked, results, and instructions or corrective actions.

i. Instructions given/received and conflicts in plans and/or specifications.

j. Contractor's verification statement.

These records shall indicate a description of trades working on the project; the number of personnel working; weather conditions encountered; and any delays encountered. These records shall cover both conforming and deficient features and shall include a statement that equipment and materials incorporated in the work and workmanship comply with the contract. Unless otherwise directed by the Contracting Officer the original and one copy of these records in report form shall be furnished to the Government daily within 24 hours after the date covered by the report, except that reports need not be submitted for days on which no work is performed. As a minimum, one report shall be prepared and submitted for every 7 days of no work and on the last day of a no work period. All calendar days, beginning with the construction NTP, shall be accounted for throughout the life of the contract. The first report following a day of no work shall be for that day only. Reports shall be signed and dated by the CQC System Manager. The report from the CQC System Manager shall include copies of test reports and copies of reports prepared by all subordinate quality control personnel.

3.10 NOTIFICATION OF NONCOMPLIANCE

The Contracting Officer will notify the Contractor of any detected noncompliance with the foregoing requirements. The Contractor shall take immediate corrective action after receipt of such notice. Such notice, when delivered to the Contractor at the work site, shall be deemed sufficient for the purpose of notification. If the Contractor fails or refuses to comply promptly, the Contracting Officer may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No part of the time lost due to such stop orders shall be made the subject of claim for extension of time or for excess costs or damages by the Contractor.

-- End of Section --

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SECTION 01525

SAFETY AND OCCUPATIONAL HEALTH REQUIREMENTS

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SECTION 01525

SAFETY AND OCCUPATIONAL HEALTH REQUIREMENTS

PART 1   GENERAL

1.1   REFERENCES

The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

U.S. ARMY CORPS OF ENGINEERS (USACE)

EM 385-1-1	(2003) Safety and Health Requirements Manual http://www.hq.usace.army.mil/soh/hqusace_soh.htm

1.2   SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only or as otherwise designated. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Accident Prevention Plan (APP); G

Activity Hazard Analysis (AHA); G

SD-06 Test Reports

Reports

Submit reports as their incidence occurs, in accordance with the requirements of the paragraph entitled, "Reports."

Accident Reports

Monthly Exposure Reports

Regulatory Citations and Violations

1.3   DEFINITIONS

a. Associate Safety Professional (ASP). An individual who is currently certified as an ASP by the Board of Certified Safety Professionals.

b. Certified Construction Health & Safety Technician (CHST). An individual who is currently certified as a CHST by the Board of Certified Safety Professionals.

c. Certified Industrial Hygienist (CIH). An individual who is currently certified as a CIH by the American Board of Industrial Hygiene.

d. Certified Safety Professional (CSP). An individual who is currently certified as a CSP by the Board of Certified Safety Professionals.

e. Certified Safety Trained Supervisor (CSTS). An individual who is currently certified as an STS by the Board of Certified Safety Professionals.

f. High Visibility Accident. Any mishap which may generate publicity and/or high visibility.

g. Medical Treatment. Treatment administered by a physician or by registered professional personnel under the standing orders of a physician. Medical treatment does not include first aid treatment even through provided by a physician or registered personnel.

h. Recordable Injuries or Illnesses. Any work-related injury or illness that results in:

(1) Death, regardless of the time between the injury and death, or the length of the illness;

(2) Days away from work;

(3) Restricted work;

(4) Transfer to another job;

(5) Medical treatment beyond first aid;

(6) Loss of consciousness; or

(7) A significant injury or illness diagnosed by a physician or other licensed health care professional, even if it did not result in (1) through (6) above.

i. Site Safety and Health Officer (SSHO). The superintendent or other qualified or competent person who is responsible for the on-site safety and health required for the project.

j. "USACE" property and equipment specified in USACE EM 385-1-1 should be interpreted as Government property and equipment.

1.4 REGULATORY REQUIREMENTS

In addition to the detailed requirements included in the provisions of this contract, work performed shall comply with USACE EM 385-1-1, and any applicable federal, state, and local, laws, ordinances, criteria, rules and regulations. Submit matters of interpretation of standards to the appropriate administrative agency for resolution before starting work. Where the requirements of this specification, applicable laws, criteria, ordinances, regulations, and referenced documents vary, the most stringent requirements shall apply.

1.5 DRUG PREVENTION PROGRAM

Conduct a proactive drug and alcohol use prevention program for all workers, prime and subcontractor, on the site. Ensure that no employee uses illegal drugs or consumes alcohol during work hours. Ensure there are no employees under the influence of drugs or alcohol during work hours. After accidents, collect blood, urine, or saliva specimens and test the injured and involved employees for the influence of drugs and alcohol. A copy of the test shall be made available to the Contracting Officer upon request.

1.6 SITE QUALIFICATIONS, DUTIES AND MEETINGS

1.6.1 Personnel Qualifications

1.6.1.1 Site Safety and Health Officer (SSHO)

Site Safety and Health Officer (SSHO) shall be provided at the work site at all times to perform safety and occupational health management, surveillance, inspections, and safety enforcement for the Contractor. The SSHO shall meet the following requirements:

Level 3:
A minimum of 5 years safety work on similar projects.
30-hour OSHA construction safety class or equivalent within the last 5 years.
An average of at least 24 hours of formal safety training each year for the past 5 years.
Competent person training as needed.

1.6.2 Personnel Duties

1.6.2.1 Site Safety and Health Officer (SSHO)

a. Conduct daily safety and health inspections and maintain a written log which includes area/operation inspected, date of inspection, identified hazards, recommended corrective actions, estimated and actual dates of corrections. Safety inspection logs shall be attached to the Contractors' daily report.

b. Conduct mishap investigations and complete required reports. Maintain the OSHA Form 300 and Daily Production reports for prime and sub-contractors.

c. Maintain applicable safety reference material on the job site.

d. Attend the pre-construction conference, pre-work meetings including preparatory inspection meeting, and periodic in-progress meetings.

e. Implement and enforce accepted APPS and AHAs.

f. Maintain a safety and health deficiency tracking system that monitors outstanding deficiencies until resolution. A list of unresolved safety and health deficiencies shall be posted on the safety bulletin board.

g. Ensure sub-contractor compliance with safety and health requirements.

Failure to perform the above duties may result in dismissal of the SSHO, and/or a project work stoppage. The project work stoppage will remain in effect pending approval of a suitable replacement.

1.6.3 Meetings

1.6.3.1 Safety Coordination Meeting

a. The Contractor will be informed, in writing, of the date of the safety coordination meeting. The purpose of the safety coordination meeting is for the Contractor and the Contracting Officer's representatives to become acquainted and explain the functions and operating procedures of their respective organizations and to reach mutual understanding relative to the administration of the overall project's Accident Prevention Plan (APP) before the initiation of work.

b. Contractor representatives who have a responsibility or significant role in accident prevention on the project shall attend the safety coordination meeting. This includes the project superintendent, site safety and health officer, quality control supervisor, or any other assigned safety and health professionals who participated in the development of the APP (including the Activity Hazard Analyses (AHAs) and special plans, program and procedures associated with it).

c. The Contractor shall discuss the details of the submitted APP to include incorporated plans, programs, procedures and a listing of anticipated AHAs that will be developed and implemented during the performance of the contract. This list of proposed AHAs will be reviewed at the meeting and an agreement will be reached between the Contractor and the Contracting Officer's representative as to which phases will require an analysis. In addition, a schedule for the preparation, submittal, review, and acceptance of AHAs shall be established to preclude project delays.

d. Deficiencies in the submitted APP will be brought to the attention of the Contractor at the safety coordination meeting, and the Contractor shall revise the plan to correct deficiencies and re-submit it for acceptance. Work shall not begin until there is an accepted APP.

1.6.3.2 Weekly Safety Meetings

Conduct weekly safety meetings at the project site for all employees. The Contracting Officer will be informed of the meeting in advance and be allowed attendance. Minutes showing contract title, signatures of attendees and a list of topics discussed shall be attached to the Contractors' daily quality control report.

1.6.3.3 3-Phase Control Meetings

The appropriate AHA shall be reviewed and attendance documented by the Contractor at the preparatory, initial, and follow-up phases of quality control inspection. The analysis should be used during daily inspections to ensure the implementation and effectiveness of safety and health controls.

1.7 TRAINING

1.7.1 New Employee Indoctrination

New employees (prime and sub-contractor) will be informed of specific site hazards before they begin work. Documentation of this orientation shall be kept on file at the project site.

1.7.2 Periodic Training

Provide Safety and Health Training in accordance with USACE EM 385-1-1 and the accepted APP. Ensure all required training has been accomplished for all onsite employees.

1.7.3 Training on Activity Hazard Analysis (AHA)

Prior to beginning a new feature of work, training will be provided to all affected employees to include a review of the AHA to be implemented.

1.8 ACCIDENT PREVENTION PLAN (APP)

The Contractor shall use a qualified person to prepare the written site-specific APP. Prepare the APP in accordance with the format and requirements of USACE EM 385-1-1 and as supplemented herein. Cover all paragraph and subparagraph elements in USACE EM 385-1-1, Appendix A, "Minimum Basic Outline for Preparation of Accident Prevention Plan". Where a paragraph or subparagraph element is not applicable to the work to be performed indicate "Not Applicable" next to the heading. Specific requirements for some of the APP elements are described below at paragraph EM 385-1-1 contents. The APP shall be job-specific and shall address any unusual in unique aspects of the project or activity for which it is written. The APP shall interface with the Contractor's overall safety and health program. The APP shall include an executed POD Form 248-R rev (1 Jun 98), Accident Prevention Program, Administrative Plan.

Any portions of the Contractor's overall safety and health program referenced in the APP shall be included in the applicable APP element and made site-specific. The Government considers the Prime Contractor to be the "controlling authority" for all work site safety and health of the subcontractors. Contractors are responsible for informing their subcontractors of the safety provisions under the terms of the contract and the penalties for noncompliance, coordinating the work to prevent one craft from interfering with or creating hazardous working conditions for other crafts, and inspecting subcontractor operations to ensure that accident prevention responsibilities are being carried out. The APP shall be signed by the person and firm (senior person) preparing the APP, the Contractor, the on-site superintendent, the designated site safety and health officer and any designated CSP and/or CIH.

Submit the APP to the Contracting Officer 15 calendar days prior to the date of the safety coordination meeting for acceptance. Work cannot proceed without an accepted APP. The Contracting Officer reviews and comments on the Contractor's submitted APP and accepts it when it meets the requirements of the contract provisions.

Once accepted by the Contracting Officer, the APP and attachments will be enforced as part of the contract. Disregarding the provisions of this contract or the accepted APP will be cause for stopping of work, at the discretion of the Contracting Officer, until the matter has been rectified.

Once work begins, changes to the accepted APP shall be made with the knowledge and concurrence of the Contracting Officer, project superintendent, SSHO and quality control manager. Should any unforeseen hazard become evident during the performance of work, the project superintendent shall inform the Contracting Officer, both verbally and in writing, for resolution as soon as possible. In the interim, all necessary action shall be taken by the Contractor to restore and maintain safe working conditions in order to safeguard onsite personnel, visitors, the public, and the environment.

Copies of the accepted plan will be maintained at the office and at the job site. The APP shall be continuously reviewed and amended, as necessary, throughout the life of the contract. Unusual or high-hazard activities not identified in the original APP shall be incorporated in the plan as they are discovered.

1.8.1 EM 385-1-1 Contents

In addition to the requirements outlined in Appendix A of USACE EM 385-1-1, the following is required:

a. Names and qualifications (resumes including education, training, experience and certifications) of all site safety and health personnel designated to perform work on this project to include the designated site safety and health officer and other competent and qualified personnel to be used such as CSPs, CIHs, STSs, CHSTs. The duties of each position shall be specified.

b. Alcohol and Drug Abuse Plan

(1) Describe plan for random checks and testing with pre-employment screening in accordance with the DFAR Clause subpart 252.223-7004, "Drug Free Work Force."

(2) Description of the on-site prevention program

c. Fall Protection and Prevention (FP&P) Plan. The plan shall be site specific and address all fall hazards in the work place and during different phases of construction. It shall address how to protect and prevent workers from falling to lower levels when they are exposed to fall hazards above 1.8 m (6 feet). A qualified person for fall protection shall prepare and sign the plan. The plan shall include fall protection and prevention systems, equipment and methods employed for every phase of work, responsibilities, assisted rescue, self-rescue and evacuation procedures, training requirements, and monitoring methods. Fall Protection and Prevention Plan shall be revised for lengthy projects, reflecting any changes during the course of construction due to changes in personnel, equipment, systems or work habits. The accepted Fall Protection and Prevention Plan shall be kept and maintained at the job site for the duration of the project. The Fall Protection and Prevention Plan shall be included in the Accident Prevention Plan (APP).

d. Training Records and Requirements. List of mandatory training and certifications which are applicable to this project (e.g. explosive actuated tools, confined space entry, fall protection, crane operation, vehicle operator, forklift operators, personal protective equipment); list of requirements for periodic retraining/certification; outline requirements for supervisory and employee safety meetings.

1.8.2 Plan Acceptance

The Contractor shall not commence physical work at the site until the plan has been accepted by the Contracting officer, or his authorized representative. In developing and implementing its Accident Prevention Plan, the Contractor is also responsible for reviewing Section 1 of the most current edition of U.S. Army Corps of Engineers Safety and Health Requirement Manual EM 385-1-1.

1.9 ACTIVITY HAZARD ANALYSIS (AHA)

The Activity Hazard Analysis (AHA) format shall be prepared using POD Form 184-R, rev 16 Oct 98. Submit the AHA for review at least 15 calendar days prior to the start of each feature of work. Format subsequent AHA as amendments to the APP. An AHA will be developed by the Contractor for every operation involving a type of work presenting hazards not experienced in previous project operations or where a new work crew or subcontractor is to perform work. The analysis must identify and evaluate hazards and outline the proposed methods and techniques for the safe completion of each feature of work. At a minimum, define activity being performed, sequence of work, specific safety and health hazards anticipated, control measures (to include personal protective equipment) to eliminate or reduce each hazard to acceptable levels, equipment to be used, inspection requirements, training requirements for all involved, and the competent person in charge of that feature of work. For work with fall hazards, including fall hazards associated with scaffold erection and removal, identify the appropriate fall protection methods used. For work with materials handling equipment, address safeguarding measures related to materials handling equipment. For work requiring excavations, include requirements for safeguarding excavations. An activity requiring an AHA shall not proceed until the AHA has been accepted by the Contracting Officer's representative and a meeting has been conducted by the Contractor to discuss its contents with everyone engaged in the activity, including on-site Government representatives. The Contractor shall document meeting attendance at the preparatory, initial, and follow-up phases of quality control inspection. The AHA shall be continuously reviewed and, when appropriate, modified to address changing site conditions or operations. The analysis should be used during daily inspections to ensure the implementation and effectiveness of the activity's safety and health controls.

The AHA list will be reviewed periodically (at least monthly) at the Contractor supervisory safety meeting and updated as necessary when procedures, scheduling, or hazards change.

Activity hazard analyses shall be updated as necessary to provide an effective response to changing work conditions and activities. The on-site superintendent, site safety and health officer and competent persons used to develop the AHAs, including updates, shall sign and date the AHAs before they are implemented.

1.10 DISPLAY OF SAFETY INFORMATION

Within 1 calendar days after commencement of work, erect a safety bulletin board at the job site. The following information shall be displayed on the safety bulletin board in clear view of the on-site construction personnel, maintained current, and protected against the elements and unauthorized removal:

a. Map denoting the route to the nearest emergency care facility.

b. Emergency phone numbers.

c. Copy of the most up-to-date APP.

d. Current AHA(s).

e. OSHA 300A Form.

f. OSHA Safety and Health Protection-On-The-Job Poster.

g. Confined space entry permit.

1.11 SITE SAFETY REFERENCE MATERIALS

Maintain safety-related references applicable to the project, including those listed in the article "References." Maintain applicable equipment manufacturer's manuals.

1.12 EMERGENCY MEDICAL TREATMENT

Contractors will arrange for their own emergency medical treatment. Government has no responsibility to provide emergency medical treatment.

1.13 REPORTS

1.13.1 Accident Reports

a. All injuries, illness, and properly damage, regardless of severity or magnitude are reportable. Reports shall be prepared on POD Form 265R and shall be submitted to the Contracting Officer no later than the end of the business day on which the incident occurred.

b. For recordable injuries and illnesses, and property damage accidents resulting in at least $2,000 in damages, the Prime Contractor shall conduct an accident investigation to establish the root cause(s) of the accident, complete the USACE Accident Report Form 3394 and provide the report to the Contracting Officer within 5 calendar day(s) of the accident. The Contracting Officer will provide copies of any required or special forms.

1.13.2 Accident Notification

Notify the Contracting Officer as soon as practical, but not later than four hours, after any accident meeting the definition of Recordable Injuries or Illnesses or High Visibility Accidents, property damage equal to or greater than $2,000. Information shall include contractor name; contract title; type of contract; name of activity, installation or location where accident occurred; date and time of accident; names of personnel injured; extent of property damage, if any; extent of injury, if known, and brief description of accident (to include type of construction equipment used, PPE used, etc.). Preserve the conditions and evidence on the accident site until the Government investigation team arrives on-site and Government investigation is conducted.

1.13.3 Monthly Exposure Reports

Monthly exposure reporting to the Contracting Officer is required to be attached to the monthly billing request. This report is a compilation of employee-hours worked each month for all site workers, both prime and subcontractor. The Contracting Officer will provide copies of any special forms.

1.13.4 Regulatory Citations and Violations

Contact the Contracting Officer immediately of any OSHA or other regulatory agency inspection or visit, and provide the Contracting Officer with a copy of each citation, report, and contractor response. Correct violations and citations promptly and provide written corrective actions to the Contracting Officer.

PART 2 PRODUCTS (Not Applicable)

PART 3 EXECUTION (Not Applicable)

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DIVISION 01 - GENERAL REQUIREMENTS

SECTION 01780

CLOSEOUT SUBMITTALS

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SECTION 01780

CLOSEOUT SUBMITTALS

PART 1 GENERAL

1.1 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-02 Shop Drawings

As-Built Drawings.

Drawings showing final as-built conditions of the project. The final CADD as-built drawings shall consist of one set of electronic CADD drawing files in the specified format, one set of original drawings, 2 sets of prints of the originals, and one set of the Government accepted working as-built drawings.

SD-03 Product Data

As-Built Record of Equipment and Materials.

Two copies of the record listing the as-built materials and equipment incorporated into the construction of the project.

Warranty Management Plan.

One set of the warranty management plan containing information relevant to the warranty of materials and equipment incorporated into the construction project, including the starting date of warranty of construction. The Contractor shall furnish with each warranty the name, address, and telephone number of each of the guarantor's representatives nearest to the project location.

Warranty Tags.

Two record copies of the warranty tags showing the layout and design.

Final Cleaning.

Two copies of the listing of completed final clean-up items.

1.2 PROJECT RECORD DOCUMENTS

1.2.1 As-Built Drawings

This paragraph covers as-built drawings complete, as a requirement of the contract. The terms "drawings," "contract drawings," "drawing files," "working as-built drawings" and "final as-built drawings" refer to contract drawings which are revised to be used for final as-built drawings.

1.2.1.1 Government Furnished Materials

One set of electronic CADD files in the specified software and format revised to reflect all bid amendments will be provided by the Government at the preconstruction conference for projects requiring CADD file as-built drawings.

1.2.1.2 Working As-Built and Final As-Built Drawings

The Contractor shall maintain 2 sets of paper drawings by red-line process to show the as-built conditions during the prosecution of the project. These working as-built marked drawings shall be kept current on a daily basis and at least one set shall be available on the jobsite at all times. Changes from the contract plans which are made in the work or additional information which might be uncovered in the course of construction shall be accurately and neatly recorded as they occur by means of details and notes. At the final inspection or upon beneficial occupancy of the facility by the user, whichever comes first, the Contractor shall provide one of the two sets of working as-built drawings to the COR for turnover with the facility. This set will serve as an advance/interim working set for the occupant of the completed facility; until such time that the final as-built drawings are furnished to them. Final as-built drawings shall be prepared after the completion of each definable feature of work as listed in the Contractor Quality Control Plan (Foundations, Utilities, Structural Steel, etc., as appropriate for the project). The working as-built marked drawings and final as-built drawings will be jointly reviewed for accuracy and completeness by the Contracting Officer and the Contractor prior to submission of each monthly pay estimate. If the Contractor fails to maintain the working and final as-built drawings as specified herein, the Contracting Officer will deduct from the monthly progress payment an amount representing the estimated cost of maintaining the as-built drawings. This monthly deduction will continue until an agreement is reached between the Contracting Officer and the Contractor regarding the accuracy and completeness of updated drawings. The working and final as-built drawings shall show, but shall not be limited to, the following information:

a. The actual location, kinds and sizes of all sub-surface utility lines. In order that the location of these lines and appurtenances may be determined in the event the surface openings or indicators become covered over or obscured, the as-built drawings shall show, by offset dimensions to two permanently fixed surface features, the end of each run including each change in direction. Splice boxes and similar appurtenances shall be located by dimensioning along the utility run from a reference point. The average depth below the surface of each run shall also be recorded.

b. The location and dimensions of any changes within the building structure.

c. Correct grade, elevations, cross section, or alignment of structures or utilities if any changes were made from contract plans.

d. Changes in details of design or additional information obtained from working drawings specified to be prepared and/or furnished by the Contractor; including but not limited to fabrication, erection, installation plans and placing details, pipe sizes, insulation material, dimensions of equipment foundations, etc.

e. Changes or modifications which result from the final inspection.

f. Where contract drawings or specifications present options, only the option selected for construction shall be shown on the final as-built drawings.

g. Modifications (change order price shall include the Contractor's cost to change working and final as-built drawings to reflect modifications) and compliance with the following procedures.

(1) Directions in the modification for posting descriptive changes shall be followed.

(2) A Modification Circle shall be placed at the location of each deletion.

(3) For new details or sections which are added to a drawing, a Modification Circle shall be placed by the detail or section title.

(4) For minor changes, a Modification Circle shall be placed by the area changed on the drawing (each location).

(5) For major changes to a drawing, a Modification Circle shall be placed by the title of the affected plan, section, or detail at each location.

(6) For changes to schedules or drawings, a Modification Circle shall be placed either by the schedule heading or by the change in the schedule.

(7) The Modification Circle size shall be 12.7 mm diameter unless the area where the circle is to be placed is crowded. Smaller size circle shall be used for crowded areas.

1.2.1.3 Drawing Preparation

The as-built drawings shall be modified as may be necessary to correctly show the features of the project as it has been constructed by bringing the contract set into agreement with Government accepted working as-built drawings, and adding such additional drawings as may be necessary. These working as-built marked drawings shall be neat, legible and accurate. These drawings are part of the permanent records of this project and shall be returned by the Contractor to the Contracting Officer after final acceptance by the Government. Any drawings damaged or lost by the Contractor shall be satisfactorily replaced by the Contractor at no expense to the Government.

1.2.1.4 Computer Aided Design and Drafting (CADD) Drawings

Only personnel proficient in the preparation of AutoDesk AutoCAD drawings shall be employed to modify the contract drawings or prepare additional new drawings. Additions and corrections to the contract drawings shall be equal in quality and detail to that of the originals. Line colors, line weights, lettering, layering conventions, and symbols shall be the same as the original line colors, line weights, lettering, layering conventions, and symbols. If additional drawings are required, they shall be prepared using the specified electronic file format applying the same graphic standards specified for original drawings. The title block and drawing border to be used for any new final as-built drawings shall be identical to that used on the contract drawings. Additions and corrections to the contract drawings shall be accomplished using AutoDesk AutoCAD files. The Contractor will be furnished AutoDesk AutoCAD files and penable. The electronic files will be supplied on compact disc, read-only memory (CD-ROM). The Contractor shall be responsible for providing all program files and hardware necessary to prepare final as-built drawings. The Contracting Officer will review final as-built drawings for accuracy and the Contractor shall make required corrections, changes, additions, and deletions.

a. CADD colors shall be the "base" colors of red, green, and blue. Color code for changes shall be as follows:

(1) Deletions (red) - Deleted graphic items (lines) shall be colored red with red lettering in notes and leaders.

(2) Additions (Green) - Added items shall be drawn in green with green lettering in notes and leaders.

(3) Special (Blue) - Items requiring special information, coordination, or special detailing or detailing notes shall be in blue.

b. All changes to the contract drawing files shall be made on the level as the original item. There shall be no deletions of existing lines; existing lines shall be over struck in red. Additions shall be in green with line weights the same as the drawing.

c. When final revisions have been completed, the cover sheet drawing shall show the wording "RECORD DRAWING AS-BUILT" followed by the name of the Contractor in letters at least 5 mm high. All other contract drawings shall be marked either "as-built" drawing denoting no revisions on the sheet or "Revised As-Built" denoting one or more revisions. Original contract drawings shall be dated in the revision block.

d. Within 10 days after Government acceptance of all of the working as-built drawings for a phase of work, the Contractor shall prepare the final CADD as-built drawings for that phase of work and submit two sets of blue/black-line prints of these drawings for Government review. The Government will promptly return one set of prints annotated with any necessary corrections. Within 10 days the Contractor shall revise the CADD files accordingly at no additional cost and submit one set of final prints for the completed phase of work to the Government. Within 10 days of substantial completion of all phases of work, the Contractor shall submit the final as-built drawing package for the entire project. The submittal shall consist of one set of electronic files on compact disc, read-only memory (CD-ROM), one set of originals, two sets of prints and one set of the Government annotated and accepted working as-built drawings. They shall be complete in all details and identical in form and function to the contract drawing files supplied by the Government. Any transactions or adjustments necessary to accomplish this is the responsibility of the

Contractor. The Government reserves the right to reject any drawing files it deems incompatible with the customer's CADD system. Paper prints, drawing files and storage media submitted will become the property of the Government upon final acceptance. Failure to submit final as-built drawing files or working as-built marked drawings as specified shall be cause for withholding any payment due the Contractor under this contract. Acceptance of final as-built drawings shall be accomplished before final payment is made to the Contractor.

1.2.1.5 Payment

No separate payment will be made for as-built drawings required under this contract, and all costs accrued in connection with such drawings shall be considered a subsidiary obligation of the Contractor.

1.2.2 As-Built Record of Equipment and Materials

The Contractor shall furnish one copy of preliminary record of equipment and materials used on the project 15 days prior to final inspection. This preliminary submittal will be reviewed and returned 2 days after final inspection with Government comments. Two sets of final record of equipment and materials shall be submitted 10 days after final inspection. The designations shall be keyed to the related area depicted on the contract drawings. The record shall list the following data:

RECORD OF DESIGNATED EQUIPMENT AND MATERIALS DATA

Description	Specification Section	Manufacturer and Catalog, Model, and Serial Number	Composition and Size	Where Used

1.2.3 Final Approved Shop Drawings

The Contractor shall furnish final approved project shop drawings 30 days after transfer of the completed facility.

1.2.4 Real Property Equipment

The Contractor shall furnish a list of installed equipment furnished under this contract. The list shall include all information usually listed on manufacturer's name plate. The "EQUIPMENT-IN-PLACE LIST" shall include, as applicable, the following for each piece of equipment installed: description of item, location (by room number), model number, serial number, capacity, name and address of manufacturer, name and address of equipment supplier, condition, spare parts list, manufacturer's catalog, and warranty. A draft list shall be furnished at time of transfer. The final list shall be furnished 30 days after transfer of the completed facility.

1.3 WARRANTY MANAGEMENT

1.3.1 Warranty Management Plan

The Contractor shall develop a warranty management plan. At least 30 days before the planned pre-warranty conference, the Contractor shall submit the warranty management plan for Government approval. The warranty management plan shall include all required actions and documents to assure that the Government receives all warranties to which it is entitled, in accordance with the Contract Clause, WARRANTY OF CONSTRUCTION. The plan shall be in narrative form and contain sufficient detail to render it suitable for use by future maintenance and repair personnel, whether tradesmen, or of engineering background, not necessarily familiar with this contract. The term "status" as indicated below shall include due date and whether item has been submitted or was accomplished. Warranty information made available during the construction phase shall be submitted to the Contracting Officer for approval prior to each monthly pay estimate. Approved information shall be assembled in a binder and shall be turned over to the Government upon acceptance of the work. The construction warranty period shall begin on the date of project acceptance and shall continue for the full product warranty period. A joint 4 month and 9 month warranty inspection shall be conducted, measured from time of acceptance, by the Contractor, Contracting Officer and the Customer Representative. Information contained in the warranty management plan shall include, but shall not be limited to, the following:

a. Roles and responsibilities of all personnel associated with the warranty process, including points of contact and telephone numbers within the organizations of the Contractors, subcontractors, manufacturers or suppliers involved.

b. Listing and status of delivery of all Certificates of Warranty for extended warranty items, to include roofs, HVAC balancing, pumps, motors, transformers, and for all commissioned systems such as fire protection and alarm systems, sprinkler systems, lightning protection systems, etc.

c. A list for each warranted equipment, item, feature of construction or system indicating:

   (1) Name of item.
   (2) Model and serial numbers.
   (3) Location where installed.
   (4) Name and phone numbers of manufacturers or suppliers.
   (5) Names, addresses and telephone numbers of sources of spare parts.
   (6) Warranties and terms of warranty. This shall include one-year overall warranty of construction. Items which have extended warranties shall be indicated with separate warranty expiration dates.
   (7) Cross-reference to warranty certificates as applicable.
   (8) Starting point and duration of warranty period.
   (9) Summary of maintenance procedures required to continue the warranty in force.
   (10) Cross-reference to specific pertinent Operation and Maintenance manuals.
   (11) Organization, names and phone numbers of persons to call for warranty service.
   (12) Typical response time and repair time expected for various warranted equipment.

d. The Contractor's plans for attendance at the 4 and 9 month post-construction warranty inspections conducted by the Government.

e. Procedure and status of tagging of all equipment covered by extended warranties.

f. Copies of instructions to be posted near selected pieces of equipment where operation is critical for warranty and/or safety reasons.

1.3.2 Performance Bond

The Contractor's Performance Bond shall remain in effect throughout the construction period, and during the life of any guaranty required under the Contract Performance Bond, Standard Form 25.

a. In the event the Contractor fails to commence and diligently pursue any construction warranty work required, the Contracting Officer will have the work performed by others. After completion of the construction warranty work, charges will be made to the remaining construction warranty funds of expenses which the Government incurred while performing the work, including, but not limited to administrative expenses.

b. In the event sufficient funds are not available to cover the construction warranty work performed by the Government, at the Contractor's expense, the Contracting Officer will have the right to recoup expenses from the bonding company.

c. Following oral or written notification of required construction warranty repair work, the Contractor shall respond in a timely manner. Written verification will follow oral instructions. Failure of the Contractor to respond will be cause for the Contracting Officer to proceed against the Contractor.

1.3.3 Pre-Warranty Conference

Prior to contract completion, and at a time designated by the Contracting Officer, the Contractor shall meet with the Contracting Officer to develop a mutual understanding with respect to the requirements of this section. Communication procedures for Contractor notification of construction warranty defects, priorities with respect to the type of defect, reasonable time required for Contractor response, and other details deemed necessary by the Contracting Officer for the execution of the construction warranty shall be established/reviewed at this meeting. In connection with these requirements and at the time of the Contractor's quality control completion inspection, the Contractor shall furnish the name, telephone number and address of a licensed and bonded company which is authorized to initiate and pursue construction warranty work action on behalf of the Contractor. This point of contact will be located within the local service area of the warranted construction, shall be continuously available, and shall be responsive to Government inquiry on warranty work action and status. This requirement does not relieve the Contractor of any of its responsibilities in connection with other portions of this provision.

1.3.4 Contractor's Response to Construction Warranty Service Requirements

Following oral or written notification by the Contracting Officer, the Contractor shall respond to construction warranty service requirements in accordance with the "Construction Warranty Service Priority List" and the three categories of priorities listed below. The Contractor shall submit a report on any warranty item that has been repaired during the warranty period. The report shall include the cause of the problem, date reported, corrective action taken, and when the repair was completed. If the

Contractor does not perform the construction warranty within the timeframes specified, the Government will perform the work and backcharge the construction warranty payment item established.

a. First Priority Code 1. Perform onsite inspection to evaluate situation, and determine course of action within 4 hours, initiate work within 6 hours and work continuously to completion or relief.

b. Second Priority Code 2. Perform onsite inspection to evaluate situation, and determine course of action within 8 hours, initiate work within 24 hours and work continuously to completion or relief.

c. Third Priority Code 3. All other work to be initiated within 3 work days and work continuously to completion or relief.

d. The "Construction Warranty Service Priority List" is as follows:

Code 1-Electrical
(1) Power failure (entire area or any building operational after 1600 hours).
(2) Security lights
(3) Smoke detectors

Code 2-Electrical
(1) Power failure (no power to a room or part of building).
(2) Receptacle and lights (in a room or part of building).

Code 3-Electrical
Street lights.

Code 3-All other work not listed above.

1.3.5 Warranty Tags

At the time of installation, each warranted item shall be tagged with a durable, oil and water resistant tag approved by the Contracting Officer. Each tag shall be attached with a copper wire and shall be sprayed with a silicone waterproof coating. The date of acceptance and the QC signature shall remain blank until project is accepted for beneficial occupancy. The tag shall show the following information.

a. Type of product/material______________________________.

b. Model number____.

c. Serial number_______________________________________.

d. Contract number_____________________________________.

e. Warranty period_________from_________to_______________.

f. Inspector's signature________________________________.

g. Construction Contractor______________________________.

Address____.

Telephone number_____________________________________.

h. Warranty contact ____.

Address ____.

Telephone number ____.

i. Warranty response time priority code __________________________.

j. WARNING - PROJECT PERSONNEL TO PERFORM ONLY OPERATIONAL MAINTENANCE DURING THE WARRANTY PERIOD.

1.4 OPERATION AND MAINTENANCE MANUALS

Operation manuals and maintenance manuals shall be submitted as specified. Operation manuals and maintenance manuals provided in a common volume shall be clearly differentiated and shall be separately indexed.

1.5 FINAL CLEANING

The premises shall be left broom clean. Stains, foreign substances, and temporary labels shall be removed from surfaces. Equipment and fixtures shall be cleaned to a sanitary condition. The site shall have waste, surplus materials, and rubbish removed. The project area shall have temporary structures, barricades, project signs, and construction facilities removed. A list of completed clean-up items shall be submitted on the day of final inspection.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

-- End of Section --

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DIVISION 01 - GENERAL REQUIREMENTS

SECTION 01900

MISCELLANEOUS PROVISIONS

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SECTION 01900

MISCELLANEOUS PROVISIONS

PART 1 GENERAL

1.1 SUBMITTALS

Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with Section 01330 SUBMITTAL PROCEDURES:

SD-01 Preconstruction Submittals

Organization Plan; G.

Provide a diagram depicting the proposed management organization. The chart shall clearly identify lines of authority and areas of responsibility. Include a narrative description of how the management team will operate, and the specific duties and responsibilities of the key individuals.

The narrative shall describe the Offeror's proposed on-site organization and structure, and shall describe how the Offeror intends to monitor and control timeliness, quality, and safety of the work at the job site, including the work of any subcontractors on all phases of the contract.

Identify the individuals proposed to fill the key management positions: Project Manager, Project Superintendent, Contractor Quality Control System Manager, Design Quality Control Manager, Safety and Health Manager. Provide resumes for each individual. Resumes must support the individual's qualifications to perform in the selected position.

Provide copies of letters of direction to each key personnel from an appropriate officer of the company.

Accident Prevention Plan

Activity Hazard Analysis; G.

SD-03 Product Data

Equipment Data

A list of all equipment furnished under this contract. This list shall include, but not be limited to, each piece of equipment with a serial number, and shall include all information shown on the manufacturer's nameplate, so as to positively identify the piece of equipment. This list shall also include the cost of each piece of equipment (less installation costs) F.O.B. construction site. This list shall be furnished as soon as possible after equipment is purchased. The list shall consist of one (1) reproducible and three (3) copies, and shall be furnished to the Contracting Officer not later than thirty (30) calendar days prior to completion of any segment of the contract work which has an incremental completion date.

Recovered Material Report

The Contractor shall provide a report listing all products meeting EPA guidelines for products containing recovered materials and quantity used for this project.

SD-06 Test Reports

Inspection of Existing Conditions.

A written report with color photographs noting the condition of the existing facilities at the time of the inspection. One copy of the report including photographs shall be submitted to the Contracting Officer, prior to construction.

Dust Control; G

Method(s) of dust control.

Excavation/Trenching Clearance

Prior to start of any excavation or trenching work, the Contractor shall obtain clearance, in writing, from the appropriate communications agency and base or area engineer. Copies of all correspondence shall be provided the Contracting Officer. Normal coordination time for obtaining the necessary permits is approximately fifteen (15) calendar days. The Contractor shall advise the Contracting Officer promptly when it appears that the normal coordination time will be exceeded.

Condition of Contractor's Operation or Storage Area

The Contractor shall submit to the Contracting Officer photographs and/or videos depicting the condition of the Contractor's Operation or Storage Area.

SD-07 Certificates

Products Containing Recovered Materials

The Contractor shall submit manufacturer's certification attesting that product meets or exceeds EPA's recovered material guidelines.

1.2 PROJECT MANAGEMENT ORGANIZATION

1.2.1 General

The Contractor is responsible for ensuring that the contract is adequately staffed to manage all of the work in full accordance and compliance with the contract requirements.

1.2.2 Organization Plan

The contractor shall submit an organization plan describing the organization it intends to structure for managing this contract. The plan shall include lines of authority, position responsibilities, and qualifications of the proposed staff. The project staff shall minimally consist of the following key personnel: Project Manager, Project Superintendent, Contractor Quality Control System Manager, Design Quality Control Manager, Safety and Health Manager. Each of the individuals selected to fill these positions is subject to acceptance by the Contracting Officer.

1.2.3 Organizational Changes

The Contractor shall maintain the project management staff at full strength at all times. When it is necessary to make changes to the staff, the Contractor shall revise the Organization Plan to reflect the changes and submit the changes to the Contracting Officer for acceptance at least fourteen (14) calendar days prior to implementation of the changes.

Substitutions for any accepted key personnel must be submitted for review and acceptance by the Contracting Officer prior to the start of work by that individual. The Contractor is informed that the Government will be allowed at least 30 days to respond. Any delays resulting from this process shall be the responsibility of the contractor and shall not be a basis for any equitable contract adjustment.

1.2.4 Project Manager

The Project Manager shall be responsible for the contractor's overall management and coordination of this contract and shall be the central point of contact with the Government for performance of all work under this contract including warranty. The Project Manager shall oversee construction accomplishment, administer all instructions, and answer all questions from the Contracting Officer pertaining to the work during the life of the contract, including the warranty period. The Project Manager shall be responsible for the complete coordination of all work in this contract. The Project Manager will be responsible for ensuring that adequate internal controls and review procedures are followed in order to eliminate conflicts, errors and omissions, and for ensuring that all technical requirements are met. Another individual may be designated to temporarily act for the Project Manager, however, forty-eight (48) hours advance notice in writing of such change shall be requested to the Contracting Officer, and no change shall be made without prior acceptance by the Contracting Officer.

The Project Manager shall have a recognized four-year college degree in engineering, architecture, or related technical field, and at least five (5) years experience in managing and supervising Department of Defense construction projects of similar size and scope.

1.2.5 Project Superintendent

A Project Superintendent shall be assigned. This individual shall have a minimum of five years experience as a superintendent on Department of Defense construction projects similar in size and scope to this contract. The project superintendent shall have overall responsibility for all operations on the jobsite. The superintendent shall be assigned no other duties.

1.2.6 Contractor Quality Control

To assure compliance with contract requirements, the Contractor shall establish and maintain quality control for materials and work, including design, covered by all sections of the TECHNICAL REQUIREMENTS in accordance with Section 01451 CONTRACTOR QUALITY CONTROL. Records shall be maintained for all operations including sampling and testing.

1.2.7 Safety

1.2.7.1 General

Site activities performed in conjunction with this contract may pose safety hazards that require specialized expertise to effectively address and eliminate. The Contractor shall be responsible for preparing and implementing an effective safety and health program throughout the entire duration of the contract.

1.2.7.2 Accident Prevention Plan (APP)

The contractor shall prepare an Accident Prevention Plan in accordance with the provisions of FAR 52.236-13 (Section 00700) and Section 00800, paragraph S-36.18. The Accident Prevention Plan shall address the contractor's overall safety program for the entire contract. The APP shall consist of the forms and documents listed in Section 00800, S36.18, ACCIDENT PREVENTION PLAN, covering the overall safety considerations for the contract as a whole.

1.2.7.3 Site-Specific Safety and Health Plan (SSHP)

The contractor shall prepare a site-specific safety and health plan addressing the safety aspects specific to the work ordered. Work on a feature of work shall not commence prior to receiving the Contracting Officer's written acceptance of both the contract Accident Prevention Plan and the site-specific safety and health plan.

The SSHP shall be prepared in accordance with the requirements specified in this section and shall comply with all federal, state, and local health and safety requirements, e.g., the Occupational Safety and Health Administration (OSHA) requirements (29 CFR 1910 and 1926) and the U.S. Army Corps of Engineers Safety and Health Requirements Manual (EM 385-1-1). The SSHP shall address those elements that are specific to the feature of work that have potential for negative effects on the safety and health of workers, the public, and other personnel on site.

An Activity Hazard Analysis (AHA), POD Form 184-R, rev 16 Oct 98, shall be submitted for all phases of construction specific to the feature of work and worksite. Work on a construction phase cannot begin until the AHA is submitted and accepted.

The SSHP shall identify the individual responsible for jobsite safety. This individual shall be present at the jobsite at all times during construction. Copies of the accepted SSHP and Accident Prevention Plan shall be available at the jobsite at all times. All workers shall know the location of these plans. All workers shall receive a safety briefing covering applicable sections of these plans prior to the start of construction.

Daily safety and health inspections shall be conducted to determine if site operations are conducted in accordance with the accepted SSHP and contract requirements. Results and observations made during these inspections shall be noted in the contractor's daily report.

1.2.7.4 Safety and Health Manager

The Safety and Health Manager shall have direct responsibility for the overall management of the contractor's Safety Program for the entire contract, as required by the US Army Corps of Engineers Safety and Health Requirements Manual, EM385-1-1, and other applicable safety standards. This individual shall have a minimum of five (5) years experience in safety on Department of Defense construction projects similar in size and scope to this contract. All members of the safety staff are subject to review and acceptance by the Contracting Officer. The Safety and Health Manager shall have no other duties.

1.3 AS-BUILT DRAWINGS

As-built drawings shall be in accordance with Section 01780 CLOSEOUT SUBMITTALS.

1.4 DUST CONTROL

The amount of dust resulting from the Contractor's work shall be controlled to prevent the spread of dust to occupied portions of the construction site and to avoid creation of a nuisance in the surrounding area in particular the adjacent aircraft parking apron. Use of water will not be permitted when it will result in, or create, hazardous or objectionable conditions such as flooding and pollution. Measures shall also be taken for dust control along haul routes and equipment parking areas.

1.5 PROTECTION

The Contractor shall take all necessary precautions to insure that no damages to private or public property will result from his operations. Any such damages shall be repaired or property replaced by the Contractor in accordance with the CONTRACT CLAUSES entitled "PERMITS AND RESPONSIBILITIES" and "PROTECTION OF EXISTING VEGETATION, STRUCTURES, EQUIPMENT, UTILITIES, AND IMPROVEMENTS", without delay, and at no cost to the Government.

1.5.1 Warning Signs and Barricades

The Contractor shall be responsible for posting warning signs or erecting temporary barricades to provide for safe conduct of work and protection of property.

1.5.2 Protection of Grassed and Landscaped Areas

The Contractor's vehicles shall be restricted to paved roadways and driveways. Vehicles shall not be driven or parked on grassed and/or landscaped areas except when absolutely necessary for the performance of the work and approved in advance by the Contracting Officer. Grassed or landscaped areas damaged by the Contractor shall be restored to their original condition without delay and at no cost to the Government.

1.5.3 Protection of Trees and Plants

Where necessary, tree branches and plants interfering with the work may be temporarily tied back by the Contractor to permit accomplishment of the work in a convenient manner, so long as they will not be permanently damaged thereby. If this is not feasible, the Contracting Officer may prune them, subject to written approval.

1.6 RESTORATION WORK

Existing conditions or areas damaged or disturbed by the Contractor's operations shall be restored to their original condition, or near original condition as possible, to the satisfaction of the Contracting Officer.

1.7 REMOVAL AND DISPOSAL

The Contractor shall salvage or recycle waste to the maximum extent practical as it relates to the capabilities of local industries. A record of the quantity of salvaged or recycled materials shall be maintained by the Contractor during the length of the project and submitted to the Contracting Officer at acceptance of the project. Quantities shall be recorded in the unit of measure of the industry. Reuse of materials on the site shall be considered a form of recycling. An example of such reuse would be the use of acceptable excavated materials as fill.

1.7.1 Title to Materials

Title to all materials and equipment to be removed, except as indicated or specified otherwise, is vested in the Contractor upon receipt of notice to proceed. The Government will not be responsible for the condition, loss or damage to such property after the Contractor's receipt of notice to proceed. Items indicated to be removed shall be removed and disposed of by the Contractor outside the limits of Government-controlled property at the Contractor's responsibility and expense before the completion and final acceptance of the work and such materials shall not be sold on the site.

1.8 INTERFERENCE WITH GOVERNMENT OPERATIONS

The Contractor shall establish work procedures and methods to prevent interference with existing operations within or adjacent to the construction area. Free passage into adjoining or adjacent buildings not in the contract will not be permitted except as approved by the Contracting Officer. Procedures and methods shall also provide for safe conduct of work and protection of property that is to remain undisturbed.

1.8.1 Coordination

The Contractor shall coordinate all work with the Contracting Officer to minimize interruption and inconvenience to the occupants or to the Government. Scheduling and programming of work will be established during the pre-construction conference.

1.8.2 Materials and Equipment

All materials and equipment required to complete the project shall be on hand before work is started.

1.8.3 Utilities and Facilities

All utilities and facilities within the area shall remain operable and shall not be affected by the Contractor's work, unless otherwise approved in writing in advance by the Contracting Officer. The Contractor shall restore damaged utilities to original condition or better at no cost to Government.

1.8.4 Staking and Flagging Existing Utilities

The Contractor, prior to start of any excavation or trenching work, shall verify the location of all utility lines shown on the drawings which are within the areas of work, and shall mark, stake, or flag each utility line along trench alignments and under areas of excavation under this project, as approved. Existing utility lines shall be located by walking trench alignments with approved equipment for locating underground pipes and cables. Utility lines so located shall be noted on the drawings.

Contractor shall process AF Form 103, Base Civil Engineering Work Clearance Request (Digging Permit) before any excavation work.

1.9 CONTRACTOR'S OPERATIONS OR STORAGE AREA

At the request of the Contractor, an open operations or storage area will be made available within the installation, the exact location of which will be determined by the Government. The Contractor shall be responsible for the security necessary for protection of his equipment and materials, and shall maintain the area free of debris. No rusty or unsightly materials shall be used for providing the secure measure and such measure shall be erected in a workmanlike manner. Before any construction commences on establishing the operation/storage area, Contractor shall take photographs and/or videos of the site in order to establish the original conditions of the site. A duplicate set shall be made and submitted to the Government for its files. Upon completion and prior to the final acceptance of the contract work, the Contractor shall restore the area to its original condition.

1.10 CONTRACTOR PARKING

Parking for the Contractor's, his employee's, and subcontractors' personal vehicles is limited to areas within the limits of construction. Personal vehicle parking is prohibited anywhere else within the boundaries of Schofield Barracks Military Base.

1.11 WORKING DIRECTIVES

1.11.1 Working Hours

All work shall be performed between the hours of 0730 to 1600 HST, Monday through Friday, except as otherwise specified. No work shall be accomplished on Saturdays, Sundays, and all federal holidays, without written permission from the Contracting Officer. Such written permission shall be available at the jobsite at all times during construction. Outages to circuits feeding predominantly industrial loads shall be performed after normal working hours, after 1800 hrs, and shall be restored before 0400 hrs. Outages to circuits feeding predominantly residential loads shall be performed between the hours of 0900 hrs and shall be restored before 1500 hrs.

1.12 INSPECTION

1.12.1 Final Inspection and Acceptance

The Contractor shall give the Contracting Officer, a minimum of fourteen (14) calendar days advance notice prior to final inspection for acceptance by the Contracting Officer. The Contractor upon notification by the Contracting Officer shall promptly and satisfactorily correct all deficiencies found on final inspection.

1.13 USE OF PRODUCTS CONTAINING RECOVERED MATERIALS

Recovered materials are materials manufactured from waste material and byproducts that have been recycled or diverted from solid waste. The Contractor shall give preference to products containing recovered material when price, performance, and availability meet project requirements. A listing of products, including the recommended recovered material content, is provided by the Environmental Protection Agency at http://www.epa.gov/cpg/products.htm. Only those products having recovered material content equal to or greater than EPA guidelines shall be used to meet this requirement.

1.14 ARCHAEOLOGICAL REQUIREMENTS

A. Should the Contractor discover any archaeological findings during excavation or earthwork, the Contractor shall stop work and notify the Contracting Officer before proceeding further.

B. The Contractor shall not proceed with construction at any archaeological site until all data recovery work has been coordinated with the 15 CES/CEVP, Hickam Air Force Base, Hawaii and the Government has approved that construction work can proceed.

C. Should archaeological discovery or provisions further delay all or a part of the work, the Contractor shall be limited to an adjustment in contract time as full compensation.

D. Archaelogical monitoring will only be required at Malama Substation.

E. The Contractor shall prepare all paper work as required for the archaeological work. Coordinate paper work with 15 CES/CEVP so that appropriate state agencies can be notified.

PART 2 PRODUCTS (NOT APPLICABLE)

PART 3 EXECUTION (NOT APPLICABLE)

SECTION 01010

STATEMENT OF WORK

1.0 General

This solicitation will result in the award of a design-build contract.

The Contractor selected as a result of this solicitation will provide all design work necessary to construct new duct lines and manholes for two (2) 46 KV circuits and a Hawaiian Electric Company (HECO) communication system, a new Hickam Air Force Base (HAFB) Back (Switching) Substation including the 11.5 KV switchgear and metering infrastructure, walls for the transformer yard, substation building structure to be named the Mamala Substation, environmental testing for duct line excavation, and installation of 11.5 KV circuits to shift loads from the existing Back Station to the new Back Station, as well as new duct lines to provide new 46KV electrical service from a pole near the existing HECO Hickam (Front) Substation to the new HECO Back Substation, and new duct lines to provide new 11.5KV electrical service from the existing HECO Hickam (Front) Substation to the new HECO Back Substation.

Concurrent with this contract, a separate utility service contract is being finalized with HECO to provide new electrical service from the pole near the existing HECO Hickam (Front) Substation to the new HECO Back Substation. Prior to the activation of this new electrical service, HECO will design and construct the new HECO Back Substation's 46 KV structure which will include a 46 KV switchgear and one (1) substation transformer, as well as the installation of one (1) 46 KV circuit from a pole near the existing HECO Front Substation to the new Mamala (Back) Substation, the 46 KV protective devices, transmission/distribution equipment, meters, and environmental testing. The new capacity should be adequate to accommodate the existing 2002 peak base load of 25.4 MVA and the projected increase by 11.8 MVA to 37.2 MVA by 2005 and 38.5 MVA by 2007 and beyond.

The Contractor selected as a result of this solicitation will provide all construction work necessary to construct new duct lines and manholes for two (2) 46 KV circuits and a Hawaiian Electric Company (HECO) communication system, a new Hickam Air Force Base (HAFB) Back (Switching) Substation including the 11.5 KV switchgear and metering infrastructure, walls for the transformer yard, substation building structure to be named the Mamala Substation, environmental testing for duct line excavation, and installation of 11.5 KV circuits to shift loads from the existing Back Station to the new Back Station as well as new duct lines to provide new 46KV electrical service from a pole near the existing HECO Hickam (Front) Substation to the new HECO Back Substation. The construction work associated with the new duct lines to provide new 11.5KV electrical service from the existing HECO Hickam (Front) Substation to the new HECO Back Substation will be optional work.

2.0 Concept Drawings

Concept drawings dated 28 May 2004 have been prepared and are provided with this solicitation. Offerors are advised that these drawings may be incomplete in some areas and may require additional design documentation, coordination, and approvals.

The Contractor selected as a result of this solicitation shall be responsible for reviewing the concept drawings and identifying those areas requiring additional design documentation, and after award of the contract, developing final drawings and specifications necessary to complete the design for Government approval and to perform the construction work.

The Contractor shall ensure that the final drawings conform to all applicable codes as well as all relevant Hawaiian Electric Company (HECO) standards. The Contractor shall revise the drawings as needed to correct any code violations at no additional cost to the Government.

The information contained on the concept drawings may be considered acceptable to the Government; however, the Contractor shall prepare additional design documents to fulfill all of the requirements contained in this section; and/or to supplement the concept drawings covering any portion of the work that cannot be constructed based on the information included in the solicitation, or any construction, which the Contractor chooses to vary from the concept drawings. All variations shall be clearly identified and explained. If necessary, the Contractor shall include any additional topographic surveys that may be needed to complete their design. Upon completion of their design, all drawings whether modified or not, shall be stamped and signed by a licensed architect or engineer.

The Contractor shall not make any changes to the location or orientation of the new Mamala Substation or major site features from that shown on the concept drawings. The exterior appearance of all buildings shall also remain unchanged.

3.0 Description of Contract

3.1 Electrical Substation

The site of this building is adjacent to open paved parking lots and miscellaneous site utilities. Although the site location is adjacent to the row of historical hangars, this respective substation is considered a part of the industrial grouping of buildings. Therefore, mimicking the architectural style and appearance of the adjacent historic building is not required. However, the appearance of the substation shall compliment and not draw unnecessary attention to itself. The existing base color scheme for painting the building is required. Site work consists of site preparation, demolition, site grading and drainage, and an underground electrical supply system.

3.2 Primary Supply and Distribution System

A new 46KV ductline and manhole system is to run from a pole adjacent to the existing Hickam Air Force Base (HAFB) Front Station and extend to the new Mamala Electrical Substation. The ductline will consist of eight 129 millimeter conduits (129C), which will be sufficient for two (2) HECO 46 KV circuits and two 129C HECO communication conduits. During the performance of this contract HECO will be requested to provide only one 46 KV circuit in three of the 129C - - one 129C will be reserved as a spare. The balance of the four 129C will be used for the second 46 KV circuit which will be accomplished under future contracts.

The 46KV duct line and manhole system has been designed to a level of which it can be presented for final review and approval by HECO. Further design action may be necessary depending upon HECO's review and comments. In addition to the 46KV system, this contract will be affecting the existing 11.5 KV system originating from the Back Station. Once the new Mamala Electrical Substation is built and tested, the existing 11.5 KV circuits will need to be extended to this new station and the equipment in the existing Back Station demolished and removed.

4.0 Additional Design Required

4.1 Structural Requirements for the Electrical Substation Building

The Contractor shall prepare and provide all necessary plans, specifications, and details necessary to construct the items described below.

a. Provide a foundation that is designed in accordance with recommendations contained in "Preliminary Soils Investigation, Upgrade Electrical System – Hickam AFB" dated March 11, 2004, prepared by Ernest Hirata and Associates, Inc.

b. Provide alternate wall systems, masonry or concrete, if desired.

c. Provide alternate roof framing system with similar clear span and interior height clearances, if desired. The current hollow core plank roof was incorporated to mimic the current architectural roof feature of the Front Station as well as afford maximum protection of the equipment within the facility.

4.2 Electrical Requirements

The Contractor shall prepare and provide all necessary plans, ductline profiles, specifications, and details necessary to extend the existing distribution circuits, originating from the existing Hickam AFB Back Station, with new 11.5 KV electrical cables, ductline, and manhole system to the new Mamala Substation.

4.3 Signage

Provide and install a building number sign on the new substation. The sign shall match existing building number signs in materials and appearance. The building numbers and the location of the signs shall be coordinated with the Base Civil Engineer and the Contracting Officer.

4.4 Use of Design Standards, Standard Details, Specifications, and UFGS

The Contractor shall base its design only on those design standards, standard details, specifications, and UFGS that are referred to in the solicitation documents. In its design submittals (see Section 01012), the Contractor shall clearly identify the source of its basis of design. A redline markup of the edited UFGS specifications shall be included in the 90% submittal. A clean copy of the accepted 90% specifications, without editing marks, shall be included in the 100% submittal.

4.6 Award of 11.5 KV Electrical Ductline Options

The final design drawings must reflect the entire run of the 11.5 KV duct lines, from the Front Station to the Mamala Back Station. Design of these ductline profiles shall provide for future connections without requiring unnecessary tear out or rework. The construction of these duct lines will only be required under this contract if the optional work is exercised.

4.7 Miscellaneous Support Work

The Contractor shall prepare and provide all necessary plans, specifications, and details necessary to support the construction work. Some of these supporting elements include such items as traffic control, landscaping restoration, erosion control, repaving, concrete repair, physical security, and fencing.

5.0 Permits and Clearances

The Contractor is responsible for identifying and obtaining all permits and clearances necessary to perform the work, including, but not limited to, excavation and trenching, hot work, and their best management plan (Note that a blanket NPDES permit has already been submitted by the Air Force and approved by the State Department of Health and can be requested from the Base Civil Engineer).

The Government has completed coordination with the State Historic Preservation Office (SHPO) regarding Section 106 requirements and based on the current drawings all requirements have been met.

It is expected that the Mamala Electrical Substation site will be archeologically monitored during the excavation work phase, most critical being the areas of the new transformer yard and the substation building.

6.0 Other Requirements

Any onsite spoils, left over from the trench material, may be placed as fill under the new transformer yard and substation building. The Contractor shall be responsible for removing all excess materials from Government property. All disturbed areas shall be restored to existing condition or better.

The Contractor shall be responsible for his own site investigation, including toning for existing underground utilities, scheduling, and testing and acceptance of the completed work. Any damage to existing utilities shall be repaired at the Contractor's expense and at no additional cost to the Government.

7.0 Additional Information

7.1 Geotechnical Data

The solicitation documents contains a report prepared by "Preliminary Soils Investigation, Upgrade Electrical System – Hickam AFB" dated March 11, 2004, prepared by Ernest Hirata and Associates, Inc.

STATEMENT OF WORK CONTENTS

ATTACHMENTS

CHAPTER 1

DESIGN OBJECTIVES AND SCOPE

1-1 SCOPE OF WORK

1-1.1 Design and construct a new electrical substation to be named the "Mamala Substation" on a site on the south side of the base adjacent to Building 1055, including all supporting utilities, site development, and ductlines. The scope consists generally of:

1-1.1.1. A 46 kV electrical ductline and manhole system including control conduits and manholes from a Hawaiian Electric Company (HECO) pole near the existing Hickam Front Station to the new Mamala Substation.

1-1.1.2. 11.5 kV electrical cables, ductline, and manhole system from the Mamala Substation to maintain the existing distribution circuits originating in the existing Hickam Back Station.

1-1.1.3. Demolition of the existing Hickam Back Station.

1-1.1.4. A new Mamala Substation building complete with lighting, power, switchgear, panelboard, batteries, automatic transfer/bypass isolation switch, telecommunication, and miscellaneous supporting appurtenances.

1-1.1.5. Miscellaneous demolition, site preparation, and utility infrastructure for the new Mamala Substation building.

1-1.1.6. Wall and gates for the new HECO transformer yard adjacent to the substation building. General grading is required within the confines of the walled compound. HECO will be responsible for all finished grading, structures, and equipment within the yard unless noted otherwise in the SOW or plans.

1-1.1.7. Design and construction for miscellaneous support work including traffic control, landscaping restoration, erosion control, paving and concrete repair, physical security, and fencing.

1-1.1.8. Archeological Monitoring. Monitor the excavation work at the Mamala Substation site only, including the transformer yard and substation building. See section 01900 for additional requirements.

1-1.1.9. Additive #1: A new 11.5 KV ductline and manhole system is shown as additive #1. Include in the proposal as a bid item the amount of lineal meters of ductline is included in the project price. This will be an evaluation factor in selecting the successful proposer. The proposed additional lineal meters of ductline shall start near the Front Station and installed toward the Back Station.

1-2 HECO COORDINATION

1-2.1 Coordinate and obtain approval signatures for all work affecting or affected by HECO. All coordination with HECO shall be done through the Contracting Officer.

1-2.2 Arrange for HECO inspectors to observe construction in a frequency and manner according to HECO's standards. The Contractor is responsible to ensure the HECO inspector has been contacted and has observed the work.

1-3 GOVERNMENT COORDINATION

1-3.1.1. This project will cross or be adjacent to other on-going projects. Coordination with the Government is critical to ensure a safe and effective job site.

1-3.1.2. In addition to projects in the direct vicinity of this project, there are multiple construction projects pertaining to the C-17 squadron due to be completed in early 2005. This project is required to provide adequate electrical power to the base to allow for the new C-17 facilities. Any delays to this project could adversely affect the ability of those projects from coming on line. Constant communication and coordination with the Government is required to ensure proper scheduling.

1-3.1.3. The C-17 projects will be using the Kuntz gate as their haul route as well as this project. Anticipate heavy traffic along the haul route due to the number of simultaneous projects using the same haul route.

1-3.1.4. This project will affect the two main thoroughfares into the base. Coordination is required with the Government to ensure smooth traffic flow. Comply with the restrictions in this RFP package regarding restricted hours of work and traffic control plans.

1-3.1.5. Coordinate all work that will affect air field operations. This includes all trenching and work fronting Hangar 35 (Building 1055) as well as the new Mamala Substation site. Provide at least 10 working days notice before the start of work.

1-3.1.6. Coordinate all telecommunications work with the Government. See the electrical SOW Chapter 5.

1-3.1.7. Portions of the new ductline affect the youth baseball fields and parking lot. Coordinate with the Government regarding restrictions in these areas during construction.

1-4 AIR FIELD TRAINING

1-4.1.1. Work in the air operations areas will require a special one day training for all personnel entering the area. Additional training will be required for all personnel operating motor vehicles.

1-5 LANDSCAPING

5-1.1 Restore all existing landscaping damaged or removed during construction to match the pre-existing condition including quantity, type, and maturity. Document with pictures prior to any demolition the condition of the site. Submit copies of these color pictures to the Contracting Officer prior to the start of demolition. The Contracting Officer will be the sole determinant if the restoration matches the prior condition based on the pictures. If pictures are not submitted, the contractor shall restore the site per the Contracting Officer's instructions.

1-6 OBJECTIVES

1-6.1 Site

1-6.1.1. The location of the Mamala Substation as shown has been approved by the Government and by HECO. Significant changes to the site are not allowed unless specifically allowed in writing by both the Government and HECO.

1-6.1.2. The 46 KV ductline from the Mamala Substation to the Front Station has been generally approved by the base and approved by HECO. However, shifting of the ductline to avoid existing utilities or to improve the efficiency of the design or construction is allowed provided that the Government and HECO approve of the changes. Submit any proposed changes to the Contracting Officer addressing how the changes will affect any pertinent electrical design issues as well as traffic, aesthetics, and noise.

1-6.2 HECO

1-6.2.1. Hawaiian Electric Company (HECO) will be providing the 46 KV cables within the contractor provided duct line and manhole system. HECO will also be providing all work within the transformer yard. Therefore, all work pertaining to or affecting these areas require approval signatures by HECO on the drawings. See Chapter 5 Electrical Design of this SOW and the electrical drawings for additional requirements. It is the intent of the Government that all work pertaining to HECO be signed off by HECO prior to the start of construction. The objective is two-fold. First to ensure that the design conforms to HECO standard, and secondly, to ensure that any changes made by HECO after the plans have been approved are minimized. Schedule and coordinate all work with HECO, provide support for, and access to facilities being prepared for their equipment. HECO's work must be completed before this project can be completed; therefore, the work schedule must include input from HECO to insure that efforts are coordinated and focused for successful completion of the project.

1-6.2.2. Failure to follow HECO standards, to obtain HECO signatures prior to the start of construction, or to have HECO inspectors observe construction could result in rejection of the installation by HECO. Rejections of work by HECO shall be corrected by the Contractor at no extra cost to the Government unless the Government is solely and directly responsible for the cause of the deficiency or directed the Contractor to contradict HECO standards.

1-7 SCHEDULE

1-7.1 The work covered by this project must be completed on schedule to meet critical milestone dates. The increased electrical capacity provided by this project must be available for use by the stated dates to serve new loads being added by other projects, and to meet the overall base requirements for power. The following table lists milestones dates that shall be met.

Milestone	Date Required By	Correlates With
Ductline and Manhole installation from Front Station to the Vandenburg intersection crossing. Includes grassing, landscape restoration, and patching.	Feb 1, 2005	Start of youth baseball season. The work in the field and adjacent areas must be completed to provide for safe use of the fields by youth.
Turn over transformer yard to HECO	March 4, 2005	Start of HECO construction. Allow HECO access to the construction site so that they will be able to accomplish their work for this project.
Turn over 46 kV ductlines to HECO	May 27, 2005	For pulling of HECO cables. Manhole and duct system must be ready and turned over to HECO for installation of their cables. Provide HECO access to all HECO manholes, ducts and related facilities.
HECO energize transformer	September 17, 2005	Start of testing metal clad switchgear. Coordinate testing with HECO.
Substation on-line with 11.5 kV circuits transferred	November 17, 2005	Start of testing of Corrosion Control Hangar Project (FY04 PDC KNMD 033007 C-17 Corrosion Control Hangar, HAFB. Substation must be on-line and carrying load by this date because of large loads added to the system by new projects coming on line.

1-8 OUTAGES

1-8.1 Duration and number of outages shall be minimized. See Chapter 5 for more specifics.

CHAPTER 2

CIVIL ENGINEERING

2-1 GENERAL REQUIREMENTS

2-1.1 General Overall Scope of Work: The general civil scope of work for this project is to provide trench Installation of new electrical ductlines, traffic control, site work for New Substation, and other assistant services described in, but not limited to, these specifications and related drawings. The services shall be performed according to the latest military design standards and other national standards, codes and regulations. The work includes, but not be limited to, excavation on open space and parking lots, and along streets and roadways; installation of concrete ductbanks, manholes and their accessories and appurtenances; concrete jacketing existing underground utilities if required clearances can not be maintained; backfilling; restoration of open cuts of concrete pads, AC or other pavements, and surface structures that are damaged, demolished or temporarily removed for this construction; site demolition work and other site work assistance at New Substation, and additional topographical survey if it is required. All work shall be finished to the satisfaction of the Contracting Officer.

2-1.2 Coordination with Other Projects: This project is only one of multiple projects being constructed in the same general area. Coordination is required between these different projects in order to ensure a smooth transition and working conditions. Provide continual coordination with the other projects via the Contracting Officer from the NTP to the final acceptance of this project. Conduct meetings as required to provide this coordination or as directed by the Contracting Officer.

2-1.3 Coordination with Government Agencies: All work shall be coordinated with the appropriate Government agency through the Contracting Officer and shall be documented in writing in accordance with other parts of this specification. The performance of all work shall include the requirements of these agencies. These include but are not limited to the following items:

2-1.3.1 Soil excavation

2-1.3.2 Traffic control

2-1.3.3 Site work for new substation

2-1.4 Outages: Phase all work to minimize the duration and number of utility outages. Coordinate and schedule outages with the Contracting Officer a minimum of 25 days prior to the scheduled outage. Outages are subject to the approval of the Contracting Officer.

2-1.5 Specifications: Use the latest applicable technical sections of Unified Facilities Guide Specifications (UFGS) and the Hawaiian Electric Company (HECO) design standards in the preparation of the final design except as specifically detailed in this specification. Where this specification does not specify, the technical sections of UFGS or HECO design standards, whichever is more stringent, should be used. This applies to soil excavation and backfill work for installation of new electrical ductlines and the site work for construction of the new substation.

2-1.6 Contractor Qualifications: Work under this section shall be performed, and equipment shall be furnished and installed, by a qualified Contractor as defined herein. The subcontractor shall have a minimum of five years of experience in the installation and testing of civil work.

2-1.7 Submit a Design Analysis and all calculations to substantiate the design of the project, including excavation, traffic control, site work, and manhole buoyancy calculation.

2-1.8 The design and installation shall comply with the Americans with Disabilities Act (ADA).

2-1.9 Provide materials and equipment that are products of manufacturers regularly engaged in the production of such products. Products shall have been in satisfactory commercial or industrial use for 2 years prior to bid opening. The 2-year period shall include applications of equipment and materials under similar circumstances and of similar size. The product shall have been on sale on the commercial market through advertisements, manufacturers' catalogs, or brochures during the 2-year period. Where two or more items of the same class of equipment are required, these items shall be products of a single manufacturer; however, the component parts of the item need not be the products of the same manufacturer unless stated in the technical section.

2-1.10 Obtain all necessary approvals and permits prior to commencement of construction. Provide the necessary labor, equipment, materials, tools, supplies, accessories, and appurtenances for construction as specified in the above mentioned plans and specifications.

2.2 SUBMITTALS

2.2.1 Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. The following shall be submitted in accordance with this and other sections of this specification.

2.2.2 Prepare plans and Specifications of civil work for the project, including excavation of trench for electrical ductlines, dewatering, backfilling and compacting, installation of concrete ductbanks and manholes, traffic control, erosion control, underground utility protection, site work for substations, demolition and restoration, products and equipment, materials, and other related services and assistances to complete the electrical work.

2.2.3 Submit the following in accordance with the submittal procedures specified in Unified Facilities Guide Specifications (UFGS) for the related civil work, such as plans, and materials and products used:

SD-01 Preconstruction Submittals
SD-02 Shop Drawings
SD-03 Product Data

SD-04 Samples
SD-05 Design Data
SD-06 Test Reports
SD-07 Certificates
SD-11 Closeout Submittal

2.2.4 As-Built Drawings: The as-built drawings shall be a record of the construction as installed. The drawings shall include all the information shown on the contract drawings, deviations, modifications, and changes from the contract drawings, however minor. The as-built drawings shall be kept at the job site and updated daily. The as-built drawings shall be a full-sized set of prints marked to reflect all deviations, changes, and modifications. The as-built drawings shall be complete and show the location, size, dimensions, part identification, and other information. Additional sheets may be added. The as-built drawings shall be jointly inspected for accuracy and completeness by the Contractor's quality control representative and by the Contracting Officer prior to the submission of each monthly pay estimate. Upon completion of the work, the Contractor shall submit three full sized sets of the marked prints to the Contracting Officer for approval. If upon review, the as-built drawings are found to contain errors and/or omissions, they will be returned to the Contractor for correction. The Contractor shall correct and return the as-built drawings to the Contracting Officer for approval within ten calendar days from the time the drawings are returned to the Contractor. Provide cad files of the as-built drawings to the Government. Also include catalog cuts indicating options provided for all materials, apparatus, and equipment.

2.3 DEMOLITION AND RESTORATION

2.3.1 Demolition and restoration work occurs at both the existing substation where new substation is going to be built and the route where the new underground electrical line is proposed to install by open trench construction.

2.3.2 Demolition work at new substation includes to abandon existing underground utilities, such as sewers and storm drains, and to remove existing concrete or AC pads or surface structures for construction of new substation. Make new underground utilities connections that are necessary to serve new substation or are required to maintain their existing services. All repairs shall be accomplished to the satisfaction of the Contracting Officer's Representative. Since the existing vault will be remained, the contractor shall protect the vault from water infiltration and inflow during raining days.

2.3.3 Repair portions of the site or surrounding areas that are damaged or left unfinished because of the demolition work or construction work. Patch, repair, and finish all surfaces and structures to match the surrounding conditions, which includes, but not limited to, existing parking lots, streets and roads, curbs, poles, signs, concrete or AC pavement, and other surface structures.

2.3.4 Repair, restore, or replace all existing structures, equipment, cables, or utilities that may be damaged or removed during the course of construction or during the demolition phase of this project to a condition that is equal or better than the existing condition. The scope of the repair or replacement work and the procedures shall be defined and completed to the satisfaction of the Contracting Officer subject to the provisions of the latest applicable technical sections of Unified Facilities Guide Specifications (UFGS). The work shall be completed in the timeliest manner in order to minimize any outages to the users.

2.4 DELIVERY, STORAGE, AND ENVIRONMENTAL PROTECTION

2.4.1 Deliver and store materials in a manner to prevent contamination, segregation, freezing and other damage.

2.4.2 The contractor shall select open space on site for storage. The location of the storage site shall be coordinated with and approved by the Contracting Officer. The contractor shall not store the materials in the buildings. Storage sites shall have necessary weather and security protections.

2.4.3 Keep dust down at all times, including during nonworking periods. Sprinkle or treat, with dust suppressants, the soil at the site, haul roads, and other areas disturbed by operations. Dry power brooming will not be permitted. Only wet cutting will be permitted for cutting concrete blocks, concrete, and bituminous concrete. Construction site runoff should be prevented from entering any storm drain or waterway directly by the use of best management practices or BMPs. Contractor shall provide erosion protection of surrounding soils. A temporary dust and erosion control plan shall be developed as a preconstruction submittal for review and approval. Such control will be generally limited to areas actually scarred or denuded in the process of constructing a project. The plan should cover BMP measures, type of treatment selected, affected areas, and reasons for selection of BMPs, type of treatment, and determination of areas.

2.5 TRAFFIC CONTROL AND TEMPORARY FACILITIES

2.5.1 During the performance of work, it becomes necessary to modify vehicular and pedestrian traffic patterns at the construction site. Notify the Contracting Officer at least 15 calendar days prior to the proposed modification date, and provide a traffic control plan, as one of preconstruction submittals, detailing the proposed controls to traffic movement for approval. The plan shall be in accordance with State and local regulations and the FHWA SA-89-006, Part VI. Provide cones, signs, barricades, lights, or other traffic control devices and personnel required to control traffic. Do not use foil-backed material for temporary pavement marking. Maintain at least one lane at all times for traffic. Obtain from the Contracting Officer the traffic control requirements for special areas and the hours when all traffic lanes shall opened to traffic. The Traffic Control Plan shall be prepared by a licensed traffic engineer. A separate traffic control plan shall be required for each road closure. Each traffic control plan shall require written approval by the government prior to implementation.

2.5.2 All work around/involving roadways, to include roadway excavations and utility crossings, shall be conducted in accordance with the Manual on Uniform Traffic Control Devices for Streets and Highways. Contractors shall provide and ensure appropriate road closure, and detour signs are established as necessary for motor and pedestrian traffic management. All road closures shall be coordinated with the Contracting Officer in advance. Self-illuminated (lighted) barricades shall be provided during hours of darkness.

Brightly-colored (orange) vests are required for all personnel working in roadways. Road closures shall require a road closure plan showing the location of signage.

2.5.3 Provide control of traffic to move vehicles and pedestrians safely and expeditiously through or around work areas while protecting the traveling public, on-site workers, and equipment. Plan the control of traffic in accordance with the Manual on Uniform Traffic Control Devices. Signs forewarning drivers about excavation work should be used.

2.5.4 During non-working hours, all excavations shall be covered with non-skid steel plates and all roads shall be open to traffic.

2.5.5 Provide all necessary temporary facilities and measures in accordance with the latest applicable technical sections of Unified Facilities Guide Specifications (UFGS) for construction operation, sanitary, safety, security, weather protection, and aesthetic purposes.

2.5.6 All excavations must be fenced when there is no active work going on. Extent of trenching and fencing should be limited to a reasonable amount. The security forces may require flashing lights on the fences. The fences need to be the standard construction fence pre-approved by the base.

2.6 EXCAVATION

2.6.1 General Excavation and Trenching: Keep excavation free from water while construction is in progress. Over excavate soft, weak, or wet excavations to additional depth and use bedding material to refill overdepths to the proper grade. Grade bottom of trenches accurately to provide uniform bearing and support for each section of pipe, conduit or duct on undisturbed soil, or bedding material as indicated or specified at every point along its entire length except for portions where it is necessary to excavate for bell holes and for making proper joints. Excavation shall be performed so that the site and the area immediately surrounding the site and affecting operations at the site shall be continually and effectively drained. Excavations into the surface soils will generally be possible using conventional excavating equipment. Excavations into the underlying volcanic tuff, especially confined trench excavations, will probably require pneumatic equipment. Trench dimensions shall be as indicated or specified. Notify the Contracting Officer immediately if it becomes necessary to remove rock or hard, unstable, or otherwise unsatisfactory material to a depth greater than indicated. Reduce the impact of excavation to daily base operations by minimizing the length of trench excavation. Do not open more than 50 meters in advance of the ductline laying in existing improved streets, sidewalks, driveways and paved areas unless specifically approved by the Contracting Officer. On-site stock piling of the excavated material for backfill on this project shall not obstruct the flow of runoff, streams, endanger a partly finished structure, impair the efficiency or appearance of any facilities, or be detrimental to the completed work. Location of stock pile(s) shall be coordinated and approved by the Contracting Officer.

2.6.2 Shoring and Sheeting: Shore and sheet excavations as described in the plan. Provide shoring bracing, trench boxes, underspinning and sheeting as required. In addition to Section 25 of EM 385-1-1 and other requirements set forth in this contract, also include provisions in the shoring and sheeting plan to prevent undermining of pavements, foundations and slabs, slippage or movement in banks or slopes adjacent to the excavation, and allow for abandonment of shoring and sheeting materials in place in critical areas as the work is completed.

2.6.3 Drainage: Plan for and provide the structures, equipment, and construction for the collection and disposal of surface and subsurface water encountered in the course of construction. Surface water shall be directed away from excavation and construction sites so as to prevent erosion and undermining of foundations. Diversion ditches, dikes, and grading shall be provided and maintained as necessary during construction. Excavated slopes and backfill surfaces shall be protected to prevent erosion and sloughing.

2.6.4 Dewatering: Groundwater flowing toward or into excavations shall be controlled to prevent sloughing of excavation slopes and walls, boils, uplifts and heave in the excavation and to eliminate interference with orderly progress of construction. Control measures shall be taken by the time the excavation reaches the water level in order to maintain the integrity of in situ material. In order to prevent settlement of surrounding buildings, structures, and foundations, do not dewater excessively. Operate the dewatering system until construction work below existing water levels is complete. Have a back-up pump and system available for immediately use.

2.6.5 NPDES Permits: Since this project is just one phase of a series of electrical system upgrades within the base, total of the disturbed areas would likely be greater than 1 acres and an NPDES permit for the construction activities should be required. Visit the Sate of Hawaii Department of Health Environmental management Division Clean Water Branch (Phone: (808) 586-4309) at 919 Ala Moana Blvd., Room 301, Honolulu, HI 96814-4920 or its website (http://www.hawaii.gov/health/eh/cwb/forms/index.html) for the permit requirements and the application procedure. Determine it will be a general or individual permit, and file the application accordingly.

2.6.6 Underground Utilities: The plans shall show all existing underground utilities known to exist. Location of the existing utilities indicated is based on a search of available plans and is approximate only. Not all existing underground utilities may be indicated on the plan. The Contractor shall physically verify the location and elevation of the existing utilities indicated prior to starting construction. The Contractor shall contact the Contracting Officer for assistance in any as-built plan search for locating existing utilities. The Contractor shall scan the construction site with electromagnetic and sonic equipment and mark the surface where existing underground utilities are discovered. Exercise care while excavating in order to protect all underground utilities. Concrete jacket any crossing underground utilities, if necessary, before backfilling. Repair any damaged underground utilities to the satisfaction of the Contracting Officer. Contact the Contracting Officer should any be found that may interfere with the new construction.

2.6.7 Backfilling: Backfill the excavation as indicated on the plan. The excavated onsite soils in unpaved areas may be reused in trench backfills, up to finish subgrade elevation, provided all rock and coral fragments larger than 3 inches in maximum dimension are removed. Backfill should be placed in 8 inch lifts and compacted to a maximum 95 percent compaction as determined by ASTM D 1557. The backfilling in paved areas shall comply to the UFGS Sections or the HECO design standards, whichever is more stringent. Construct backfill as indicated and specified in the drawings and specifications. Coordinate backfilling with testing of utilities. Testing for the following shall be complete before final backfilling: water distribution systems. Test bedding and backfill for conformance to specified requirements. Test backfill to be used under roads and paved areas for conformance to special requirements. Use hand-operated, plate-type, vibratory, or other suitable hand tampers in areas not accessible to larger rollers or compactors. Avoid damaging underground utilities and protective coatings. Compact material in accordance with the latest Unified Facilities Guide Specifications (UFGS) or HECO design standards, whichever is more stringent. For areas where compaction is a problem, flowable fill can be used. Flowable fill shall have low thermal resistivity and meet the heat dissipation requirement for electrical ductlines, and shall not cause groundwater table arising.

2.6.8 Backfilling for Electrical Ductlines: Provide the fluidized thermal backfill for electrical ductlines as shown on the plan per Heco specifications that is included as Attachment 5 of this RFP. Provide buried warning and identification tape installed in accordance with the manufacturer's recommendation.

2.6.9 Structures and Surfaces: Protect newly backfilled areas and adjacent structures, slopes, or grades from traffic, erosion settlement, or any other damage. Repair and reestablish damaged or eroded grades and slopes and restore surface construction prior to acceptance. Provide and maintain a temporary road surface of cold patch over backfilled portion until permanent pavement is repaired. As a minimum, maintain one-way traffic on roads and streets crossed by trenches. Fully open roads and streets to traffic within two days. During non-working hours, excavation shall be covered with thick steel plates by the Contractor. Perform work in accordance with requirements specified in the latest Unified Facilities Guide Specifications (UFGS).

2.6.10 Disposal of Excavated material: All waste and/or excess excavated materials shall be immediately removed and disposed of outside the limit of Government property. All disposal must comply with the most stringent local, State, and Federal requirements including, but not limited to, 40 CFR 241, 40 CFR 243, and 40 CFR 258, if applicable.

2.7 TREE PROTECTION AND TRANSPLANTING

2.7.1 The Contractor shall identify the tree protection and/or transplanting requirements on the design plans. Refer to the latest UFGS sections 02915, 02930A, and 02930N, where applicable. The contractor shall also consult to the Heco Tree Planting Guidelines for safety and protection requirements to both the public and the underground utilities. All tree removal and transplanting work shall be done via the Contracting Officer.

CHAPTER 3

ARCHITECTURAL REQUIREMENTS

3-1 GENERAL REQUIREMENTS

3-1.1 General Overall Scope of Work: The general architectural scope of work for this project is to provide a new concrete masonry unit structure as described in these specifications and related drawings. The structure shall be designed and constructed complete in such that all systems operate to the satisfaction of the Contracting Officer.

3-1.2 Coordination with Other Projects: This project is only one of multiple projects being constructed in the same general area. Coordination is required between these different projects in order to ensure a smooth transition and working conditions. Provide continual coordination with the other projects via the Contracting Officer from the NTP to the final acceptance of this project. Conduct meetings as required to provide this coordination or as directed by the Contracting Officer.

3-2 GENERAL DESIGN PROVISIONS

3-2.1 Considerations: Design will consider architectural compatibility with the local environment, functional requirements, economy of construction, energy conservation. Additionally, facility will be designed in harmony with the architectural character of existing facilities that are to remain and that are considered to be historically or architecturally significant to the environment.

3-2.2 Functional Design: Facility designs will be governed by the functional requirements of the project, will conform to existing criteria and standards, and will be consistent with applicable congressional cost limitations.

3-2.3 Design for Flexibility: Flexibility in architectural design facilities the change or expansion of a structure to accommodate future functional requirements with minimum expenditure of resources.

3-2.4 Environmental Protection: Environmental protection shall consist of the prevention of environmental pollution as the result of construction operation under this scope of work. For the purpose of this specification, environmental pollution is defined as the presence of chemical, physical, or biological elements or agents which adversely affect human health or welfare, unfavorably alter ecological balances or importance to human life, affect other species of importance to man, or degrade the utilization of the environment for aesthetic and recreational purposes.

3-2.5 Design Criteria and Standards: Although not all-inclusive, this paragraph contains Federal requirements that are established by executive orders, public laws, local requirements, and other directives.

3-2.5.1 Occupational Safety and Health Act Considerations: The Occupational Safety and Health Act of 1970 require that safety standards issued by the Secretary of Labor be followed in the work place. Section 19 of this Act requires Federal agencies to establish and maintain effective and comprehensive programs, consistent with the standards issued by the Secretary of Labor. Those standards issued by the Secretary of Labor that affect the design of buildings are principally found in the General Industry Standards, 20 CFR 1910, Occupational Safety and Health Administration, Department of Labor, 200 Constitution Avenue, N.W., Washington, D.C. 20210. The design of all facilities that serve as places of employment will conform to, or be consistent with, all applicable standards published under the Occupational Safety and Health Act (OSHA) of 1970. In the case of an apparent conflict between this document and OSHA Standards, the standard providing the greatest degree of safety will govern.

3-2.5.2 Physical Disabilities Background: Design and construction of building and facilities must ensure that they will be readily accessible to individuals with physical disabilities. Design and Construction must conform to the Uniform Federal Accessibility Standards (UFAS) and the Americans with Disabilities Act (ADA).

3-2.5.3 The project shall be designed in accordance with all regional and national applicable codes, such as the Uniform Building Code and NFPA 101.

3-2.5.4 Building Construction: Building construction criteria shall follow the listing in Military Handbook, MIL-HDBK-1008C, Fire Protection for Facilities.

3-2.6 Specifications: Use the latest applicable technical sections of the Corps of Engineers Guide Specifications in the preparation of the final design except as specifically detailed in this specification.

3-2.7 Designer Qualifications: For the architectural design, provide the services of a registered, Professional Registered Architect, registered to practice in the United States and who has a minimum of 5 continuous years experience as a registered professional.

3-2.8 Contractors Experience: The contractor shall have experience in a combination of design and construction projects from inception until final completion and the fast track approach. The contractor shall be responsible for the quality of design and the quality of construction for the completed project.

3-3 SUBMITTALS

3-3.1 Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with this and other sections of this specifications:

3-3.2 ROUGH CARPENTRY WORK

3-3-2.1 SD-02 Shop Drawings: Drawings of field erection details, including materials and methods of fastening nailers in conformance with Factory Mutual wind uplift rated systems.

3-3-2.2 SD-07 Certificates: Manufacturer's certificates (approved by an American Lumber Standards approved agency) attesting that lumber and material not normally grade marked meet the specified requirements. Certificate on Inspection for grade marked material by an American Lumber Standards Committee (ALSC) recognized inspection agency prior to shipment.

3-3.3 JOINT SEALING

3-3.3.1 SD-03 Product Data: Manufacturer's descriptive data including storage requirements, shelf life, curing time, instructions for mixing and application, and primer data (if required). A copy of the Material Safety Data Sheet shall be provided for each solvent, primer or sealant material.

3-3.3.2 SD-07 Certificates: Certificates of compliance stating that the materials conform to the specified requirements.

3-3.4 ELASTOMERIC ROOFING

3-3.4.1 SD-02 Shop Drawings: Drawings showing size of sheets, position of sheets and splices, flashing details, fastening patterns where applicable for insulation and membrane sheets, and expansion joints details. Details showing construction of water cutoffs to be used at membrane terminations at the end of the day's work to seal the roofing system from water intrusion.

3-3.4.2 SD-03 Product Data: Manufacturer's instructions for preparing and installing the membrane, flashings, seams, insulation, nailers and other accessories. Protection plan showing areas to be protected, type of material used; a plan to protect the membrane from damage until completion of work by other trades, and a description of the method of repairing the roofing. The inspection procedure for substrate suitability including decks, curbs and insulation installation, prior to start of the work. Inspection procedures during and after placement of the membrane, and after completion of work by other trades.

3-3.4.3 SD-07 Certificates: Certificates of compliance attesting that the roofing system and materials meet specification requirements. The certificates shall list the components required for the specified fire and wind uplift resistance ratings.

3-3.5 FLASHING AND SHEET METAL

3-3.5.1 SD-02 Shop Drawings: Indicate thicknesses, dimensions, fastenings and anchoring methods, expansion joints, and other provisions necessary for thermal expansion and contraction. Scaled manufacturer's catalog data may be submitted for factory fabricated items.

Expansion joints; G

Flashing at roof penetrations; G

Drip edge; G

Eave flashing; G

3-3.5.2 SD-11 Closeout Submittals: Quality Control Plan, submit for sheet metal work in accordance with paragraph entitled "Field Quality Control."

3-3.6 STEEL DOORS AND FRAMES

3-3.6.1 SD-02 Shop Drawings: Show elevations, construction details, metal gages, hardware provisions, method of glazing, and installation details.

Doors; G

Frames; G

Accessories; Weatherstripping

3-3.6.2 SD-03 Product Data: Submit manufacturer's descriptive literature for doors, frames, and accessories. Include data and details on door construction, panel (internal) reinforcement, insulation, and door edge construction. When "custom hollow metal doors" are provided in lieu of "standard steel doors," provide additional details and data sufficient for comparison to ANSI A250.8 requirements.

3-3.6.3 AD-04 Samples: Where colors are not indicated, submit manufacturer's standard colors and patterns for selection.

3-3.7 DOOR HARDWARE

3-3.7.1 SD-02 Shop Drawings:

Hardware schedule; G. Prepare and submit schedule in the following items:

Hard-Ware Items	Quantity	Size	Reference Publication Type No.	Finish	Mfr. Name and Catalog No.	Key Control Symbol	UL Mark (If fire rated and listed)	BHMA Finish Design-ation
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Keying system; G

3-3.7.2 SD-03 Product Data:

Hardware items; G

3-3.7.3 SD-08 Manufacturer's Instructions:

Installation

3-3.7.4 SD-10 Operation and Maintenance Data

Hardware Schedule items, Data Package 1; G

Submit data package in accordance with Section 01781, "Operation and Maintenance Data."

3-3.7.5 Closeout Submittals:

Key bitting

3-3.8 PAINTS AND COATING

3-3.8.1 The current MPI, "Approved Product List" which lists paint by brand, label, product name and product code as of the date of contract award, will be used to determine compliance with the submittal requirements of this specification. The contractor may choose to use a subsequent MPI "Approved Product List", however, only one list may be used for the entire contract and each coating system is to be from a single manufacturer. All costs on a particular substrate must be from a single manufacturer. No variation from the MPI Approved Products List is acceptable.

3-3.8.2 Samples of specified materials may be taken and tested for compliance with specification requirements.

3-3.8.3 In keeping with the intent of Executive Order 13101, "Greening the Government through Waste Prevention, Recycling, and Federal Acquisition", products certified by SCS as meeting SCS SP01-01 shall be given preferential consideration over registered products. Products that are registered shall be given preferential consideration over products not carrying an EPP designation.

3-3.8.4 SD-02 Shop Drawings

Piping identification

Submit color stencil codes

3-3.8.5 Product Data

Coating; G

Manufacturer's Technical Data Sheets

3-3.8.6 Samples

Color; G, submit manufacturer's samples of paint colors. Cross reference color samples to color scheme as indicated.

Sample Textured Wall Coating System Mock-up; G

3-3.8.7 SD-07 Certificates

Applicator's qualifications

Qualification Testing laboratory for coatings; G

3-3.8.8 SD-08 Manufacturer's Instructions

Application instructions

Mixing, detailed mixing instructions, minimum and maximum application temperature and humidity, potlife, and curing and drying times between coats.

Manufacturer's Material Safety Data Sheets, submit for coatings, solvents, and other potentially hazardous materials, as defined in FED-STD-313

3-3.8.9 SD-10 Operation and Maintenance Data

Coatings; G, preprinted cleaning and maintenance instructions for all coating systems shall be provided.

3-3.9 LOUVERS

3-3.9.1 SD-02 Shop Drawings: Wall Louvers, show all information necessary for fabrication and installation of louvers. Indicate materials, sizes, thicknesses, fastening, and profiles.

3-3-9.2 SD-04 Samples:

Wall Louvers; G, colors of finishes shall closely approximate colors indicated. Where color is not indicated, submit the manufacturer's standard colors to be the Contracting Officer for selection.

3-4 PRODUCTS

3-4.1 Lumber Products

Solid sawn and finger-jointed lumber shall bear an authorized gradestamp or grademark recognized by ALSC, or an ALSC recognized certification stamp, mark, or hammerbrand. Surfaces that are to be exposed to view shall not bear grademarks, stamps, or any type of identifying mark. Hammer marking will be permitted on timbers when all surfaces will be exposed to view.

3-4.2 Sizes

Lumber and material sizes shall conform to requirements of the rules or standards under which produced. Unless otherwise specified, lumber shall be surfaced on four sides. Unless otherwise specified, sizes indicated are nominal sizes, and actual sizes shall be within manufacturing tolerances allowed by the standard under which the product is produced.

3-4.3 Treatment

Exposed areas of treated wood that are cut or drilled after treatment shall receive a field treatment in accordance with AWPA M4. Items of all-heart material of cedar, cypress, or redwood will not require preservative treatment, except when in direct contact with soil. Except as specified for all-heart material of the previously mentioned species, the following items shall be treated:

a. Wood members in contact with or within 18 inches of soil.

b. Wood members in contact with water.

c. Wood members exposed to the weather and those used in roofing systems or as nailing strips or nailers over fiberboard or gypsum-board wall sheathing as a base for wood siding.

d. Wood members set into concrete regardless of location, including flush-with-deck wood nailers for roofs.

e. Wood members in contact with concrete that is in contact with soil or water or that is exposed to weather.

3-4.4 Fire-Retardant Treatment

Fire-retardant treated wood shall be pressure treated in accordance with AWPA C20 for lumber and AWPA C27 for plywood. Material use shall be defined in AWPA C20 and AWPA C27 for Interior Type [A] [and] [B] and Exterior Type. Treatment and performance inspection shall be by an independent and qualified testing agency that establishes performance ratings. Each piece or bundle of treated material shall bear identification of the testing agency to indicate performance in accordance with such rating. Treated materials to be exposed to rain wetting shall be subjected to an accelerated weathering technique in accordance with ASTM D 2898 prior to being tested for compliance with AWPA C20 or AWPA C27.

3-4.5 Sealants

Sealant shall be used before expiration of shelf life. Multi-component sealants shall be mixed according to manufacturer's printed instructions. Sealant in guns shall be applied with a nozzle of proper size to fit the width of joint. Joints shall be sealed as detailed in the drawings. Sealant shall be forced into joints with sufficient pressure to expel air and fill the groove solidly. Sealant shall be installed to the indicated depth without displacing the backing. Unless otherwise indicated, specified, or recommended by the manufacturer, the installed sealant shall be dry tooled to produce a uniformly smooth surface free of wrinkles and to ensure full adhesion to the sides of the joint; the use of solvents, soapy water, etc., will not be allowed. Sealants shall be installed free of air pockets, foreign embedded matter, ridges and sags. Sealer shall be applied over the sealant when and as specified by the sealant manufacturer.

3-4.6 Roofing Membrane

Adhesives, splicing cements, solvents, and sealants shall be as recommended by the membrane manufacturer.

Fasteners for sheet-metal flashing shall be corrosion resistant steel annular-type nails or screws. Fasteners for anchoring the roofing membrane shall be as approved by the membrane manufacturer and identical to those used to obtain the wind uplift rating.

Flashing shall be of ultra-violet resistant materials as recommended by the membrane manufacturer. Prefabricated shaped flashings shall be used where possible. Sheared edges of metal flashings that contact the membrane shall be turned into a tight hem.

Membrane shall conform to ASTM D 4637, Type I EPDM, Grade 1; Class U, 0.060 inch minimum thickness.

3-4.7 Flashing

Lead, lead-coated metal, and galvanized steel shall not be used. Any metal listed by SMACNA Arch. Manual for a particular item may be used, unless otherwise specified or indicated. Materials shall conform to the requirements specified below and to the thicknesses and configurations established in SMACNA Arch. Manual. Different items need not be of the same metal, except that if copper is selected for any exposed item, all exposed items shall be copper.

Furnish sheet metal items in 8 to 10 foot lengths. Single pieces less than 8 feet long may be used to connect to factory-fabricated inside and outside corners, and at ends of runs. Factory fabricate corner pieces with minimum 12 inch legs. Provide accessories and other items essential to complete the sheet metal installation. These accessories shall be made of the same materials as the items to which they are applied.

Exposed exterior sheet metal items of aluminum shall have a baked-on, factory-applied color coating of polyvinylidene fluoride (PVF2) or other equivalent fluorocarbon coating applied after metal substrates have been cleaned and pretreated. Finish coating dry-film thickness shall be 0.8 to 1.3 mils.

Use the same metal or a metal compatible with the item fastened. Use stainless steel fasteners to fasten dissimilar materials.

3-4.8 Steel Doors

ANSI A250.8, except as specified otherwise. Prepare doors to receive hardware specified in, "Door Hardware." Undercut where indicated. Exterior doors shall have top edge closed flush and sealed to prevent water intrusion. Doors shall be 1 3/4 inches thick, unless otherwise indicated.

ANSI A250.8, Level 1, physical performance Level C, Model 1, of size(s) and design(s) indicated and core construction as required by the manufacturer.

For pairs of exterior steel doors which will not have aluminum astragals or removable mullions, as specified in, "Door Hardware," provide overlapping steel astragals with the doors.

Provide anchors to secure the frame to adjoining construction. Provide steel anchors, zinc-coated or painted with rust-inhibitive paint, not lighter than 18 gage.

Fire doors and frames shall bear the label of Underwriters Laboratories (UL), Factory Mutual Engineering and Research (FM), or Warnock Hersey International (WHI) attesting to the rating required. Testing shall be in accordance with NFPA 252 or UL 10B. Labels shall be metal with raised letters, and shall bear the name or file number of the door and frame manufacturer. Labels shall be permanently affixed at the factory to frames and to the hinge edge of the door. Door labels shall not be painted.

Provide minimum hardware reinforcing gages as specified in ANSI A250.6. Drill and tap doors and frames to receive finish hardware. Prepare doors and frames for hardware in accordance with the applicable requirements of ANSI A250.8 and ANSI A250.6. For additional requirements refer to BHMA A115. Drill and tap for surface-applied hardware at the project site. Build additional reinforcing for surface-applied hardware into the door at the factory. Locate hardware in accordance with the requirements of ANSI A250.8, as applicable. Punch door frames to receive a minimum of two rubber or vinyl door silencers on lock side of single doors and one silencer for each leaf at heads of double doors. Set lock strikes out to provide clearance for silencers.

All surfaces of doors and frames shall be thoroughly cleaned, chemically treated and factory primed with a rust inhibiting coating as specified in ANSI A250.8.

Finished doors and frames shall be strong and rigid, neat in appearance, and free from defects, waves, scratches, cuts, dents, ridges, holes, warp, and buckle. Molded members shall be clean cut, straight, and true, with joints coped or mitered, well formed, and in true alignment. Dress exposed welded and soldered joints smooth. Design door frame sections for use with the wall construction indicated. Corner joints shall be well formed and in true alignment. Conceal fastenings where practicable

3-4.9 Door Hardware

Provide, as far as feasible, locks, hinges, and closers of one lock, hinge,or closer manufacturer's make. Modify hardware as necessary to provide features indicated or specified.

Hardware to be applied to metal [or to prefinished doors] shall be made to template. Promptly furnish template information or templates to door and frame manufacturers. Template hinges shall conform to BHMA A156.7. Coordinate hardware items to prevent interference with other hardware.

Provide all hardware necessary to meet the requirements of NFPA 80 for fire doors and NFPA 101 for exit doors, as well as to other requirements specified, even if such hardware is not specifically mentioned under paragraph entitled "Hardware Schedule." Such hardware shall bear the label of Underwriters Laboratories, Inc., and be listed in UL Bld Mat Dir or labeled and listed by another testing laboratory acceptable to the Contracting Officer.

BHMA A156.13, Series 1000, Operational Grade 1, Security Grade 2. Provide mortise locks with escutcheons not less than 7 by 2 1/4 inches with a bushing at least 1/4 inch long. Cut escutcheons to suit cylinders and provide trim items with straight, beveled, or smoothly rounded sides, corners, and edges. Knobs and roses of mortise locks shall have screwless shanks and no exposed screws.

Provide cylinders and cores for new locks, including locks provided under other sections of this specification. Cylinders and cores shall have seven pin tumblers. Cylinders shall be products of one manufacturer, and cores shall be the products of one manufacturer. Rim cylinders, mortise cylinders, and knobs of bored locksets shall have interchangeable cores which are removable by special control keys. Stamp each interchangeable core with a key control symbol in a concealed place on the core.

The Government will provide permanent cylinders with cores and keys for mortise locksets, auxiliary locks, and exit devices. Cylinders shall be as manufactured by Best Lock Corp., Arrow Lock Corp., or Falcon Lock. The Contractor shall give written notice 90 days prior to the required delivery of the cylinders. Temporary cores and keys for the Contractor's use during construction, and for testing the locksets, shall be provided by the Contractor.

In addition to meeting test requirements of BHMA A156.2 and BHMA A156.13, knobs, roses, and escutcheons shall be 0.050 inch thick if unreinforced. If reinforced, outer shell shall be 0.035 inch thick and combined thickness shall be 0.070 inch, except knob shanks shall be 0.060 inch thick.

Provide lever handles in lieu of knobs. Lever handles for exit devices shall meet the test requirements of BHMA A156.13 for mortise locks. Lever handle locks shall have a breakaway feature (such as a weakened spindle or a shear key) to prevent irreparable damage to the lock when a force in excess of that specified in BHMA A156.13 is applied to the lever handle. Lever handles shall return to within 1/2 inch of the door face.

Provide knurled or abrasive coated knobs or lever handles. BHMA A156.18. Hardware shall have BHMA 630 finish (satin stainless steel), unless specified otherwise.

3-4.10 Painting

Where a space or surface is indicated to be painted, include the following unless indicated otherwise.

a. Surfaces behind portable objects and surface mounted articles readily detachable by removal of fasteners, such as screws and bolts.

b. New factory finished surfaces that require identification or color coding and factory finished surfaces that are damaged during performance of the work.

c. Existing coated surfaces that are damaged during performance of the work.

Includes new surfaces of the building and appurtenances as indicated and existing coated surfaces made bare by cleaning operations. Where a space or surface is indicated to be painted, include the following items, unless indicated otherwise.

a. Exposed columns, girders, beams, joists, and metal deck; and

b. Other contiguous surfaces.

Do not paint the following unless indicated otherwise.

a. Surfaces concealed and made inaccessible by panelboards, fixed ductwork, machinery, and equipment fixed in place.

b. Surfaces in concealed spaces. Concealed spaces are defined as enclosed spaces above suspended ceilings, furred spaces, attic spaces, crawl spaces, elevator shafts and chases.

c. Steel to be embedded in concrete.

d. Copper, stainless steel, aluminum, brass, and lead except existing coated surfaces.

e. Hardware, fittings, and other factory finished items.

3-4.11 Metal Louvers

Weather resistant type, with bird screens and made to withstand a wind load of not less than 30 pounds per square foot. Wall louvers shall bear the AMCA certified ratings program seal for air performance and water penetration in accordance with AMCA 500-D and AMCA 511. The rating shall show a water penetration of 0.20 or less ounce per square foot of free area at a free velocity of 800 feet per minute.

For aluminum louvers, provide 1/2 inch square mesh, 14 or 16 gage aluminum or 1/4 inch square mesh, 16 gage aluminum bird screening. For steel louvers, provide 1/2 inch square mesh, 12 or 16 gage zinc-coated steel; 1/2 inch square mesh, 16 gage copper; or 1/4 inch square mesh, 16 gage zinc-coated steel or copper bird screening. Mount screens in removable, rewirable frames of same material and finish as the louvers.

CHAPTER 4

STRUCTURAL DESIGN

4-1 GENERAL. The structural criteria established herein will be used for structural loading, design and installation of all structural systems and foundation, including manufacturing, erection, supervision, testing, and quality assurance of the completed installation of the building. All structural calculations shall be checked and initialed as such by a registered engineer other than the original design engineer. Construction Documents (drawings and specifications) shall be sealed and signed by a Professional Engineer registered and licensed to perform work in the jurisdiction. Use the latest applicable technical sections of the Unified Facilities Guide Specifications (UFGS) and the Hawaiian Electric Company (HECO) design standards in the preparation of the final design except as specifically detailed in this specification. Where this specification does not specify, the technical section of UFGS or HECO design standards, whichever is more stringent, should be used.

4-2 STRUCTURAL WORK. The structural work generally consists of, but is not limited to, design and construction of:

4-2.1 Building Foundations: Continuous wall and spread footings or others as required by the Geotechnical Engineering Report.

4-2.2 Ground Floor Slab System: Unless otherwise noted, minimum 125mm concrete slab-on-grade with #10 @ 380 on centers each way on 100 mm gravel cushion.

4-2.3 Load Bearing and Non-load Bearing Walls, masonry walls acting primarily as bearing and/or shear walls.

4-2.4 Vertical Framing Members, including masonry walls.

4-2.5 Horizontal Framing Members, including precast prestressed concrete members with concrete topping, and cast-in-place beams and slabs.

4-2.6 Connection Details, including all fastening requirements between structural members and attachments between structural members and non-structural attachments such as architectural, mechanical and electrical elements.

4-2.7 Special Conditions, such as expansion, construction and control joints.

4-2.8 Miscellaneous Structures, including site structures and foundations.

4-3 DESIGN CRITERIA. Structural design shall be in accordance with the following:

4-3.1 UFC 1-200-01: Design: General Building Requirements

4-3.2 IBC 2003: International Building Code 2003 as amended by UFC 1-200-01

4-3.3 TI-809-04: Seismic Design for Buildings where required by UFC 1-200-01

4-3.4 ASCE-7 98: Wind loads

4-3.5 UBC 97: Uniform Building Code, 1997 Edition for HECO criteria.

4-3.6 Reinforced Masonry Engineering Handbook

4-3.7 PCI handbook – Precast exterior walls, and precast concrete plank design.

4-4 MINIMUM LOAD STANDARDS:

4-4.1 Dead Loads: Actual

4-4.2 Roof Live Load: 1.0 KPa (20 psf) with code allowed reductions

4-4.3 Roof Mechanical / Electrical Hung Systems: 0.5 KPa (10 psf)

4-4.4 Floor Live Load: 15.0 KPa (300 psf)

4-4.5 Wind Load: 47 m/s (105 mph) Basic Wind Speed, Exposure 'C' per ASCE 7-98 or 45 m/s (100 mph) Basic Wind Speed, Exposure 'C' per 1997 UBC, whichever governs.

4-4.6 Seismic Load: Seismic Use Group I - Standard Occupancy Structure, Ss = 0.61g, S1 = 0.175g, Site Classification: Class 'E', Seismic Design Category 'D'

4-5 MATERIAL STRENGTHS AND PROPERTIES.

4-5.1 Reinforced Concrete: All concrete shall conform to ACI Manual of Standard Practice.

4-5.1.1. Minimum Concrete Strength at 28 days: 21 MPa (3000 psi)

4-5.1.2. Reinforcing Steel: ASTM A615M, Grade 420, Fy = 420 MPa (60ksi)

4-5.1.3. Welded Wire Fabric: ASTM A185, Galvanized, Fy= 480 MPa (70 ksi)

4-5.2 Concrete Masonry Units (CMU): ASTM C90, f'm = 10.5 MPa (1500 psi)

4-5.2.1. Mortar: ASTM 270, Type S

4-5.2.2. Grout: ASTM C476, minimum compressive strength of 14 Mpa (2000 psi) at 28 days

4-5.3 Structural Steel

4-5.3.1. W-Shapes: ASTM A992, Grade 345 MPa

4-5.3.2. Channels, Angles and Plates: ASTM A36M, Grade 250 MPa

4-5.3.3. Machine Bolts: ASTM A307

4-5.3.4. Anchor Bolts: ASTM A307

4-5.3.5. All steel shall be hot-dipped galvanized.

4-6 SELECTION OF STRUCTURAL SYSTEM: The structural systems shall conform to all applicable criteria and guidance and commonly accepted methods of practice. The following elements shall be evaluated and addressed:

4-6.1 Material Considerations:

4-6.1.1. The foundation and floor slab shall be of poured-in-place concrete construction.

4-6.1.2. The structural walls shall be of masonry or concrete construction. Exterior CMU walls are to have a minimum of 0.05 percent vertical reinforcement with a maximum spacing of 1200 mm (48 inches).

4-6.1.3. The roof framing shall be of reinforced concrete and/or prestressed concrete.

4-6.2 Other Considerations:

4-6.2.1. Total Life Cycle cost effectiveness of the system.

4-6.2.2. Constructability.

4-6.2.3. Experience level of local contractors and labor force.

4-6.2.4. Availability and use of local materials.

4-6.2.5. Sustainable Design.

4-7 SPECIAL REQUIREMENTS

4-7.1 Future Expansion: The substation building shall be designed to accommodate future expansion in the northwest direction.

4-7.2 Material Testing: As a minimum, the following concrete tests shall be performed: slump, unit weight, temperature, and strength. Refer to Unified Facilities Guide Specification Section 03300, Cast-in-Place Structural Concrete, for sampling and testing standards. All costs shall be borne by the Contractor.

4-7.3 Special Inspection: Continuous or periodic special inspection by a certified inspector shall be performed on seismic-resisting systems. See Unified Facilitates Guide Specification Section 01452, Special Inspection for Seismic-Resisting Systems, for inspection requirements and other details.

4-7.4 Overhead mounted features weighing 14 kilograms (31 pounds) or more are to be mounted so that they resist forces of 0.5 times the component weight in any direction and 1.5 times the component weight in the downward direction.

4-7.5 HECO Requirements: Design of the building structures shall conform to the more stringent requirements of this Chapter or HECO's requirement as shown on attached appendix.

4-7.6 Antiterrorism /Force Protection Requirements: The building is not routinely occupied and need not meet the requirements of UFC 4-010-01 (8 October 2003) Minimum Antiterrorism Standards for Buildings which is intended for inhabited buildings. Reference paragraph 1-4 INTENT on page 1-3 and paragraph 1-6 APPLICABILITY on page 1-4. This building is not routinely occupied by 11 or more DoD personnel and therefore, does not qualify as an "inhabited building" per definition on page A-3 Appendix A – DEFINITIONS.

CHAPTER 5

ELECTRICAL SYSTEMS

5-1 General Requirements

5-1.1 Applicable Standards

2002 National Electrical Code (NEC 2002)
Military Standards (MIL-STD-1472E)
American National Standards Institute (ANSI)
American Society for Testing and Materials (ASTM)
Illuminating Engineering Society (IES)
Institute of Electrical and Electronics Engineers (IEEE)
National Electrical Manufacturers Association (NEMA)
National Fire Protection Association (NFPA)
Underwriters' Laboratories (UL)
Uniform Facilities Criteria (UFC3-520-01) Interior Electrical Design
TI 800-01 Electrical Design Criteria, 10 July 1998
MIL-HNBK 1012/3 Telecommunication Premise
TIA/EIA 568-B Commercial Building Telecommunications Wiring Standard and Amendments
TIA/EIA 569 Pathways and Spaces
TIA/EIA 606 Administration
TIA/EIA 607 Grounding
AFJMAN 32-1080 Electrical Power Supply and Distribution
UFC 3-520-01 Interior Electrical Design, Appendix G-3

5-1.2 General Overall Scope of Work: The general electrical scope of work for this project is to provide all new equipment and wiring described in these specifications and related drawings. The building systems shall be designed and constructed complete such that all systems operate to the satisfaction of the Contracting Officer. The general scope of work items are as follows:

5-1.2.1. Provide new 46 KV ductline and manhole system from a HECO pole near the existing Hickam Front Station to a new HECO Mamala substation. This includes an associated HECO control wire ductline.

5-1.2.2. Provide new Mamala substation complete including building, switchgear and associated station power and lighting.

5-1.2.3. Mamala Substation and existing Hickam Front Station shall have the same system phasing and phase rotation for parallel operation.

5-1.2.4. Coordinate and obtain approval of Mamala substation and 46 KV ductline design with Hawaiian Electric Company.

5-1.2.5. Extend existing 11.5 KV distribution circuits to new substation switchgear.

5-1.2.6. Provide warning signs at all points where the circuits fed from the Mamala station can be backfed or backfeed circuits fed from the Front Station. These signs shall warn the operator to NOT close into the circuit without first shutting down either of the power sources.

5-1.2.7. Additive #1: A new 11.5 KV ductline and manhole system is shown as additive #1. Include in the proposal as a bid item the amount of lineal meters of ductline is included in the project price. This will be an evaluation factor in selecting the successful proposer. The proposed additional lineal meters of ductline shall start near the Front Station and installed toward the Back Station.

5-1.2.8. Disconnect and remove existing Hickam Back Station switchgear. Maintain 120/208V power panel in substation room.

5-1.2.9. Disconnect and remove transformer station TS-2013 and re-establish primary service to primary circuit via a new pad mounted air switch.

5-1.2.10. Verify the size of the existing feeder to Bishop Point. The feeder has fire proofing and could not be verified during the preliminary investigation. The best information available from the Navy is that the cable is #4/0. Verify and provide the appropriate splice kit.

5-1.2.11. The short circuit level with one new 10/12.5 MVA HECO transformer connected to the new switchgear shall not exceed 100 MVA. If this level is exceeded, provide current limiting reactors to limit fault levels.

5-1.3 Coordination with Other Projects: This project is only one of multiple projects being constructed in the same general area. Coordination is required between these different projects in order to ensure a smooth transition and working conditions. Provide continual coordination with the other projects via the Contracting Officer from the NTP to the final acceptance of this project. Conduct meetings as required to provide this coordination or as directed by the Contracting Officer.

5-1.4 Coordination with Government Agencies: All work shall be coordinated with the appropriate Government agency through the Contracting Officer and shall be documented in writing in accordance with other parts of this specification. The designs of these systems shall include the requirements of these agencies. These include but are not limited to the following systems:

5-1.4.1. Outside plant primary power

5-1.4.2. Inside plant secondary power

5-1.4.3. Outside and inside plant telephone

5-1.5 Outages: Phase all work to minimize the duration and number of utility outages. Coordinate and schedule outages with the Contracting Officer a minimum of 25 days prior to the scheduled outage. Outages are subject to the approval of the Contracting Officer.

5-1.5.1. Outages to primary circuits shall be no longer than 4 hours unless it can be accomplished while the facilities are not in normal operation and the schedule is approved specifically by the Contracting Officer. If in cases where outages are longer than specified, the Government may for critical facilities require an alternate source of power such as an alternate circuit or generator power. See 5-1.5.5 for the approval procedures.

5-1.5.2. Outages to circuits feeding predominantly industrial loads shall be performed after normal working hours after 1800 hrs and shall be restored before 0400 hrs.

5-1.5.3. Outages to circuits feeding predominantly residential loads shall be performed between the hours of 0900 hrs and shall be restored before 1500 hrs.

5-1.5.4. Special coordination is required with the Hawaii Air National Guard (HIANG) facilities. Do not schedule outages during times when the HIANG has scheduled exercises or active mission functions. Coordinate with the Contracting Officer when these times are. If outages are necessary during these times, provide alternate means of power to the affected facilities including an alternate circuit or portable generators.

5-1.5.5. The Contracting Officer will be the sole determinant if the Contractor's justification for an outage longer than 4 hours or during critical HIANG times is valid. If approved, he will also determine if the Contractor's proposal for alternate power source is adequate and complete. The outage shall not proceed until the Contracting Officer has approved the complete plan in writing. All costs for the alternate source of power and temporary connections shall be borne by the Contractor.

5-1.6 All designs and work shall comply with the National Electrical Code (NEC) 2002 and be consistent with commercial industry standards and practices.

5-1.7 Specifications: Use the latest applicable technical sections of the Corps of Engineers Guide Specifications using the SPECSINTACT program in the preparation of the final design except as specifically detailed in this specification. Deletions from the specifications shall be kept to a minimum and only in cases where the item is not applicable to the project.

5-1.8 Designer Qualifications: For the electrical design, provide the services of a registered, Professional Electrical Engineer registered to practice in the U.S., and who has a minimum of 7 continuous years experience as a registered professional with at least 3 documented examples of design of 15 kV class substations, including metal clad switchgear, and 11.5 kV (or higher) distribution systems. Submit documentation of the relevant experience including the project title, project cost (electrical only), date completed, client including reference name and contact telephone number, and a 50 word minimum description of the scope of the project. Also include any relevant experience coordinating with 46 kV (or higher) systems. For the telecommunications design, provide the services of a designer as recognized by BICSI as a RCDD, and who has a minimum of 3 years experience providing telecommunications design.

5-1.9 Contractor Qualifications: Work under this section shall be performed, and equipment shall be furnished and installed, by a qualified Contractor as defined herein. The electrical subcontractor shall have a minimum of five years of experience in the installation and testing of interior electrical power and lighting systems including 15 kV substations and 5 years of experience installing outdoor underground electrical ductlines and manholes. Also include any relevant experience coordinating with 46 kV (or higher) systems. Installers of the telecommunications systems shall have a minimum of two years experience in installing and testing copper voice and fiber optic telecommunications systems.

5-1.10 All designs and work shall comply with the latest sections of the National Fire Protection Association and the other codes and regulations listed in this document.

5-1.11 Submit a basis for design and all calculations to substantiate the design of the project including load, short circuit, voltage drop, illumination and other calculations. Submit protective device coordination curves to demonstrate that selective coordination has been achieved based on the actual products furnished.

5-1.12 All materials, equipment, and devices shall be new and shall be listed by the Underwriter's Laboratory Inc. (UL), ETL, or an approved third party testing organization. As a minimum, comply with the workmanship and standards described in "The American Electrician's Handbook" by Croft and the requirements of the NFPA 70.

5-1.13 All products used shall be commercial or specification grade. Residential grade products are not acceptable.

5-1.14 The electrical design and installation shall comply with the Americans with Disabilities Act (ADA).

5-1.15 The electrical design shall be designed for seismic conditions, zone 2.

5-1.16 All electrical systems shall be field tested to demonstrate proper working condition per a nationally recognized testing association standards or in accordance with the manufacturer's field testing procedures.

5-1.17 Coordinate all power and telecommunications requirements with the other disciplines. Provide services for all equipment, apparatus, devices, described or required in all other sections of this RFP package. Provide the power and telecommunications equipment wiring and connections to provide a fully functional building with the exception of the systems where the Government will provide, install, and test the equipment.

5-1.18 All conduit shall be concealed where there are walls, ceiling spaces or other logical and normally utilized methods to conceal conduit unless exposed conduits are specifically allowed by this specification or by the Contracting Officer.

5-1.19 All apparatus including panelboard, transfer switch, and transformer shall be surface mounted in the substation room. Arrange the equipment in a logical and efficient arrangement that maximizes use of space.

5-1.20 Provide materials and equipment that are products of manufacturers regularly engaged in the production of such products. Products shall have been in satisfactory commercial or industrial use for 2 years prior to bid opening. The 2-year period shall include applications of equipment and materials under similar circumstances and of similar size. The product shall have been on sale on the commercial market through advertisements, manufacturers' catalogs, or brochures during the 2-year period. Where two or more items of the same class of equipment are required, these items shall be products of a single manufacturer; however, the component parts of the item need not be the products of the same manufacturer unless stated in the technical section.

5-1.21 Provide laminated phenolic plastic identification nameplates for each switchgear section, breaker cubicle, panelboard, equipment enclosure, relay, transfer switch, and wiring device. Nameplates shall include apparatus ID, voltage, phase, and frequency. Secure permanently to enclosures.

5-1.21.1. For vacuum circuit breakers, provide two nameplates. The first shall include the following: "Circuit (insert name), 11.5 KV, 3 phase, (if a main breaker:) Fed from HECO breaker #(insert number), Manufacturer: (insert manufacturer's name and model number). The second mounted adjacent to the first shall include the following: (insert size wire) phase conductor, (insert size wire) neutral.

5-1.22 Install cable tags over the fireproofing, if any, and locate the tags so that they are clearly visible without disturbing any cabling or wiring in the manholes, handholes, and vaults.

5-1.23 Stamp covers of manholes for use. Use "ELECTRIC" for 11.5 kV electrical manholes. Use wording as required by HECO for 46 kV and HECO control manholes.

5-1.24 Dispose of excess contaminated soil off site. Non-contaminated compactable soil can be used as backfill material in the new transformer yard site. Coordinate the maximum volume the yard can accommodate with HECO. Any excess material not accepted by HECO shall be disposed of off site.

5-1.25 All open trenches shall be enclosed by a fence when no active work is taking place. The extent of open trench shall be limited to a reasonable amount to allow for efficient and expeditious work. Do not leave exposed long lengths of open trench. The type of fence used shall be approved by the Security Forces on base and shall comply in color, height, construction, and use. Provide flashing lights on fences as directed by the base Security Forces. Provide additional protections such as signage and additional lights where trenches pass near housing areas.

5-1.26 Provide signs adjacent to the work site warning drivers of on going construction.

5-1.27 Pad mounted primary air switches shall be dead front air switches with stainless steel housings and hardware.

5-1.28 All exterior mounted junction boxes and enclosures shall be stainless steel.

5-1.29 Apparatus finishes – Exterior mounted apparatus shall be factory painted to comply with the Hickam Air Force Base standard color scheme.

5-1.30 See attached appendices for additional information regarding HECO standards and base standards. The requirements of this section shall overrule and conflicts with the base standards found in the appendix. The HECO standards shall overrule any conflicts with this RFP package.

5-2 Submittals

5-2.1 Government approval is required for submittals with a "G" designation; submittals not having a "G" designation are for information only. When used, a designation following the "G" designation identifies the office that will review the submittal for the Government. The following shall be submitted in accordance with this and other sections of this specification:

5-2.2 ELECTRICAL WORK

5-2.2.1. SD-02 Shop Drawings

5-2.2.1.1. Electrical Equipment; G

a) Detail drawings consisting of equipment drawings, illustrations, schedules, instructions, diagrams, and other information necessary to define the installation. Detail drawings shall show the rating of items and systems and how the components of an item and system are assembled, function together, and how they will be installed on the project. Data and drawings for component parts of an item or system shall be coordinated and submitted as a unit. Data and drawings shall be coordinated and included in a single submission. Multiple submissions for the same equipment or system are not acceptable except where prior approval has been obtained from the Contracting Officer. In such cases, a list of data to be submitted later shall be included with the first submission. Detail drawings shall show physical arrangement, construction details, connections, finishes, materials used in fabrication, provisions for conduit or busway entrance, access requirements for installation and maintenance, physical size, electrical characteristics, foundation and support details, and equipment weight. Drawings shall be drawn to scale and/or dimensioned. Optional items shall be clearly identified as included or excluded. Detail drawings shall as a minimum include:

1. Transformers.
2. Pad mounted primary air switches.
3. Switchgear including schematic wiring diagrams.
4. Metering.
5. Battery system including calculations for the battery and charger.
6. Grounding.
7. Panelboards.

8. Automatic transfer switch/isolation bypass switch

9. Conduit (interior and exterior).

10. Cables and wire.

11. Busduct

12. Single line electrical diagrams including primary and metering.

13. Handholes

14. Manholes

15. Lighting

16. Manhole development plans including manhole dimensions, layouts, grounding, existing and new penetrations, and racking.

17. Splices and terminations.

b) Structural drawings showing the structural or physical features of major equipment items, components, assemblies, and structures, including foundations or other types of supports for equipment and conductors. These drawings shall include accurately scaled or dimensioned outline and arrangement or layout drawings to show the physical size of equipment and components and the relative arrangement and physical connection of related components. Weights of equipment, components and assemblies shall be provided when required to verify the adequacy of design and proposed construction of foundations or other types of supports. Dynamic forces shall be stated for switching devices when such forces must be considered in the design of support structures. The appropriate detail drawings shall show the provisions for leveling, anchoring, and connecting all items during installation, and shall include any recommendations made by the manufacturer.

c) Electrical drawings including single-line and three-line diagrams, and schematics or elementary diagrams of each electrical system; internal wiring and field connection diagrams of each electrical device when published by the manufacturer; wiring diagrams of cabinets, panels, units, or separate mountings; interconnection diagrams that show the wiring between separate components of assemblies; field connection diagrams that show the termination of wiring routed between separate items of equipment; internal wiring diagrams of equipment showing wiring as actually provided for this project. Field wiring connections shall be clearly identified.

d) If departures from the contract drawings are deemed necessary by the Contractor, complete details of such departures, including changes in related portions of the project and the reasons why, shall be submitted with the detail drawings. Approved departures shall be made at no additional cost to the Government.

e) Shop drawings of the primary metal clad switchgear metering sections and relay details and specifications shall be submitted and approved by HECO.

5-2.2.2. SD-03 Product Data

5-2.2.2.1. Fault Current and Protective Device Coordination Study; G.

a) The study shall be submitted along with protective device equipment submittals. No time extensions or similar contract modifications will be granted for work arising out of the requirements for this study. Approval of protective devices proposed shall be based on recommendations of this study. The Government shall not be held responsible for any changes to equipment, device ratings, settings, or additional labor for installation of equipment or devices ordered and/or procured prior to approval of the study.

5-2.2.2.2. Manufacturer's Catalog; FIO

a) Data composed of catalog cuts, brochures, circulars, specifications, product data, and printed information in sufficient detail and scope to verify compliance with the requirements of the contract documents.

5-2.2.2.3. Material, Equipment, and Fixture Lists; FIO

a) A complete itemized listing of equipment and materials proposed for incorporation into the work. Each entry shall include an item number, the quantity of items proposed, and the name of the manufacturer of each item.

5-2.2.2.4. Installation Procedures; FIO

a) Installation procedures for rotating equipment, transformers, switchgear, panels, and grounding. Procedures shall include diagrams, instructions, and precautions required to install, adjust, calibrate, and test devices and equipment.

5-2.2.2.5. Onsite Tests; G.

a) A detailed description of the Contractor's proposed procedures for on-site tests.

5-2.2.2.6. Support Structures; FIO

a) Manufacturer's design analysis and calculations for structures, foundations, anchor bolts, and supports differing from those indicated in the contract drawings, and for prefabricated structures. Calculations shall be made by a registered professional engineer with demonstrated experience in substation structural design in the last three years. The manufacturer shall provide a list of projects complete with points of contact, addresses and telephone numbers.

5-2.2.2.7. Battery; G

a) Calculations for the battery and associated charger indicating the basis used in defining loads, selecting cell types, and determining the battery ampere-hour capacity and physical size. Calculations shall be provided to determine capacity for the battery charger and be similar to those shown in the Appendix to IEEE Std 485, including explanatory data. Calculations for the battery-charger shall demonstrate that the output voltage and current provided are adequate to comply with the preceding requirements.

5-2.2.3. SD-06 Test Reports

5-2.2.3.1. Factory Test Reports; FIO.

5-2.2.3.2. Six copies of the information described below in 216 x 280 mm binders having a minimum of 5 rings from which material may readily be removed and replaced, including a separate section for each test. Sections shall be separated by heavy plastic dividers with tabs.

a) A list of equipment used, with calibration certifications.

b) A copy of measurements taken.

c) The dates of testing.

d) The equipment and values to be verified.

e) The conditions specified for the test.

f) The test results, signed and dated.

g) A description of adjustments made.

5-2.2.3.3. Factory tests shall be performed, as follows, in accordance with the applicable publications and with other requirements of these specifications. The Contracting Officer shall be notified at least 10 days before the equipment is ready for testing. The Contracting Officer reserves the right to witness the tests.

a) Power Transformer: Manufacturer's standard routine tests in accordance with IEEE C57.12.00.

b) Power Transformer: Reduce full-wave, chopped-wave, and full-wave impulse test on each line and neutral terminal, in accordance with IEEE C57.98.

c) Power Transformer: Tests for transformer losses in accordance with IEEE C57.12.90.

d) High-Voltage Circuit Breakers: Manufacturer's standard tests in accordance with IEEE C37.09 and IEEE C37.081.

e) High-Voltage Air Switches: Manufacturer's standard tests in accordance with IEEE C37.34 and IEEE C37.41.

f) Protective Relays: Seismic tests in accordance with IEEE C37.98. Surge withstand tests in accordance with IEEE C37.90.1.

g) Relaying Current Transformers: Manufacturer's standard tests in accordance with IEEE C57.13.

h) Instrument Current Transformers: Manufacturer's standard tests in accordance with IEEE C57.13.

i) Voltage Regulators: Manufacturer's standard tests in accordance with IEEE C57.15.

j) High-Voltage Fuses: Manufacturer's standard tests in accordance with IEEE C37.41.

k) Neutral Grounding Resistor: Manufacturer's standard tests in accordance with IEEE Std 32.

l) Electrical Power Insulators: Manufacturer's standard tests in accordance with ANSI C29.1.

5-2.2.3.4. Field Test and Commissioning Plan; G.

a) A detailed description of the Contractor's proposed procedures for onsite test and commissioning procedures shall be submitted 20 days prior to testing the installed system. No testing or commissioning will be performed until the test plan is approved. The test plan shall consist of complete field test procedures including tests to be performed, test equipment required, and tolerance limits.

b) The test and commissioning plan shall be reviewed and approved by both the Government and HECO prior to the commencement of any tests or commissioning procedures.

c) Ensure that the Mamala Substation and the Front Station have the same phasing and phase rotation for parallel operation.

5-2.2.3.5. Field Test Reports; G.

a) Six copies of the information described below in 216 x 280 mm binders having a minimum of 5 rings from which material may readily be removed and replaced, including a separate section for each test. Sections shall be separated by heavy plastic dividers with tabs.

1. A list of equipment used, with calibration certifications.

2. A copy of measurements taken.

3. The dates of testing.

4. The equipment and values to be verified.

5. The conditions specified for the test.

6. The test results, signed and dated.

7. A description of adjustments made.

8. Final position of controls and device settings.

9. Documentation of phasing and phase rotation for both Front and Mamala Substations to show that they are the same. Document test procedures and results.

5-2.2.3.6. Shielded Cables Rated 2,001 Volts or Greater; G

a) The following tests shall be performed in addition to those specified above. Section or paragraph references are to AEIC CS5 or AEIC CS6 as applicable, unless otherwise stated.

1. High potential test voltages shall be as required by Table B1 of AEIC CS5 or AEIC CS6 as applicable, rather than by NEMA WC 8.

2. If high potential testing is done with an ac test voltage as specified in paragraph HIGH-VOLTAGE TEST SOURCE, an additional test shall be made using a dc test voltage rated at 75 percent of the specified full dc test voltage, for 5 consecutive minutes.

3. Production sampling tests shall be performed in accordance with Section D. Sampling frequency and failure contingencies shall be in accordance with paragraph G.3. Unless otherwise approved, samples shall not be taken from the middle of extruder runs of insulation or shielding made only for one continuous shipping length of cable, if such sampling will result in the need to repair the sampled area.

4. Partial discharge tests shall be performed in accordance with Section E, paragraph E.2, and Section F.

b) Flame Tests

1. All single-conductor cable assemblies shall pass IEEE Std 383 flame tests, paragraph 2.5, using the ribbon gas burner. If such tests, however, have previously been made on identical cables, these tests need not be repeated. Instead, certified reports of the original qualifying tests shall be submitted. In this case the reports furnished under paragraph REPORTS, shall verify that all of each cable's materials, construction, and dimensions are the same as those in the qualifying tests.

c) Independent Tests

1. The Government may at any time make visual inspections, continuity or resistance checks, insulation resistance readings, power factor tests, or dc high-potential tests at field test values. A cable's failure to pass these tests and inspections, or failure to produce readings consistent with acceptable values for the application, will be grounds for rejection of the cable.

5-2.2.3.7. Grounding Tests; G

a) Perform ground resistivity tests for the installed grounding system to demonstrate the ground to earth resistance is equal or lower to that of the minimum requirements of the specifications. The results of the tests shall be submitted and shall include the date of the test, the resistance measured, and the conditions at the time of the test.

b) The resistance of the grounding grid shall be measured using the fall-of-potential method defined in IEEE Std 81. Soil resistivity in the area of the grid shall be measured concurrently with the grid measurements. Ground resistance measurements shall be made before the electrical distribution system is energized and shall be made in normally dry conditions not less than 48 hours after the last rainfall. Resistance measurements of separate grounding electrode systems shall be made before the systems are bonded together below grade. The combined resistance of separate systems may be used to meet the required resistance, but the specified number of electrodes must still be provided.

1. Single rod electrode - 1 ohm.

2. Grid electrode - 1 ohm.

c) Ground-Grid Connection Inspection

1. All below-grade ground-grid connections will be visually inspected by the Contracting Officer before backfilling. The Contractor shall notify the Contracting Officer 24 hours before the site is ready for inspection.

5-2.2.4. SD-07 Certificates

5-2.2.4.1. Materials and Equipment; FIO.

a) The label or listing of the Underwriters Laboratories, Inc., will be accepted as evidence that the materials or equipment conform to the applicable standards of that agency. In lieu of this label or listing, a statement from a nationally recognized, adequately equipped testing agency indicating that the items have been tested in accordance with required procedures and that the materials and equipment comply with all contract requirements will be accepted. However, materials and equipment installed in hazardous locations must bear the UL label unless the data submitted from other testing agency is specifically approved in writing by the Contracting Officer. Items which are required to be listed and labeled in accordance with Underwriters Laboratories must be affixed with a UL label that states that it is UL listed. No exceptions or waivers will be granted to this requirement. Materials and equipment will be approved based on the manufacturer's published data.

b) For other than equipment and materials specified to conform to UL publications, a manufacturer's statement indicating complete compliance with the applicable standard of the American Society for Testing and Materials, National Electrical Manufacturers Association, or other commercial standard, is acceptable.

5-2.2.4.2. Qualifications; G.

a) Submit documentation of the Electrical Engineer showing continuous electrical design experience as a registered electrical engineer for a minimum of 7 years. The certificates shall also include documentation of relevant design experience on at least three 15 KV (or higher) substations, including metal clad switchgear, and 11.5 kV (or higher) distribution systems. Include the project title, project cost (electrical only), date completed, client including reference name and contact telephone number, and a 50 word minimum description of the scope of the project. Also include any relevant experience coordinating with 46 kV (or higher) systems.

5-2.2.5. SD-10 Operations and Maintenance Manual; FIO

5-2.2.5.1. Six copies of operation and maintenance manuals, within 7 calendar days following the completion of tests and including assembly, installation, operation and maintenance instructions, spare parts data which provides supplier name, current cost, catalog order number, and a recommended list of spare parts to be stocked. Also include short circuit study and Protective Device Coordination (PDC) studies. Manuals shall also include data outlining detailed procedures for system startup and operation, and a troubleshooting guide which lists possible operational problems and corrective action to be taken. A brief description of all equipment, basic operating features, and routine maintenance requirements shall also be included. Documents shall be bound in a binder marked or identified on the spine and front cover. A table of contents page shall be included and marked with pertinent contract information and contents of the manual. Tabs shall be provided to separate different types of documents, such as catalog ordering information, drawings, instructions, and spare-parts data. Index sheets shall be provided for each section of the manual when warranted by the quantity of documents included under separate tabs or dividers.

5-2.2.5.2. Three additional copies of the instructions manual within 30 days following the approval of the manuals.

5-2.2.6. SD-11 Closeout Submittal

5-2.2.6.1. As-Built Drawings; G

a) The as-built drawings shall be a record of the construction as installed. The drawings shall include all the information shown on the contract drawings, deviations, modifications, and changes from the contract drawings, however minor. The as-built drawings shall be kept at the job site and updated daily. The as-built drawings shall be a full-sized set of prints marked to reflect all deviations, changes, and modifications. The as-built drawings shall be complete and show the location, size, dimensions, part identification, and other information. Additional sheets may be added. The as-built drawings shall be jointly inspected for accuracy and completeness by the Contractor's quality control representative and by the Contracting Officer prior to the submission of each monthly pay estimate. Upon completion of the work, the Contractor shall submit three full sized sets of the marked prints to the Contracting Officer for approval. If upon review, the as-built drawings are found to contain errors and/or omissions, they will be returned to the Contractor for correction. The Contractor shall correct and return the as-built drawings to the Contracting Officer for approval within ten calendar days from the time the drawings are returned to the Contractor. Provide autocad and .pdf files of the as-built drawings to the Government. Also include catalog cuts indicating options provided for all materials, apparatus, and equipment.

5-2.3 OUTSIDE PLANT TELECOMMUNICATIONS

5-2.3.1. SD-02 Shop Drawings

5-2.3.1.1. Telephone System; FIO

5-2.3.1.2. Installation; FIO

a) Detail drawings, consisting of a complete list of equipment and material, including manufacturer's descriptive and technical literature, performance charts and curves, and catalog cuts. Detail drawings shall also contain complete configuration information, wiring diagrams and any other details required to demonstrate that the cable system has been coordinated to support the transmission systems identified in the specifications and drawings. Drawings shall show proposed layout and anchorage of equipment and appurtenances, and equipment relationship to other parts of the work including clearance for maintenance and operations. Include in the submittal, a complete cable diagram and plan of the work.

5-2.3.2. SD-03 Product Data

5-2.3.2.1. Spare Parts; FIO

5-2.3.2.2. Conduit; G

a) A data list of recommended spare parts, tools, and test equipment for each different item of material and equipment specified prior to beneficial occupancy. The data shall include a complete list of parts and supplies, with current unit prices and source of supply.

5-2.3.2.3. Installation; G

a) Printed copies of the manufacturer's recommendations for the material being installed, prior to installation. Installation of the item will not be allowed to proceed where installation procedures, or any part thereof, are required to be in accordance with those recommendations until the recommendations are received and approved.

5-2.3.2.4. Acceptance Tests; G

a) Test plans defining all tests required to ensure that the system meets specified requirements. The test plans shall define milestones for the tests, equipment, personnel, facilities, and supplies required. The test plans shall identify the capabilities and functions to be tested.

5-2.3.2.5. Cutover and Records; G

a) The cutover plan shall provide procedures and schedules for relocation of facility station numbers without interrupting service to any active location.

5-2.3.3. SD-06 Test Reports

5-2.3.3.1. Acceptance Tests; FIO

a) Test reports in booklet form showing all field tests performed, upon completion and testing of the installed system.

5-2.3.4. SD-07 Certificates

5-2.3.4.1. Telephone System; FIO

a) Proof that the items furnished under this section conform to the specified requirements in FCC, ICEA, REA, RUS, ANSI, ASTM, NFPA, EIA, or UL, where materials and equipment are so specified.

5-2.3.4.2. Qualifications; G

a) The qualifications of the manufacturer and installation supervisor as specified.

5-2.3.5. SD-11 Closeout Submittals

5-2.3.5.1. Record Drawings; G

a) Record drawings for the installed wiring system showing the actual location of conduit routing, and size. Provide autocad and .pdf files of the as-built drawings to the Government.

5-2.4 INSIDE PLANT TELECOMMUNICATIONS

5-2.4.1. SD-02 Shop Drawings

5-2.4.1.1. Premises Distribution System; G

a) Detail drawings including a complete list of equipment and material. Detail drawings shall contain complete wiring and schematic diagrams and other details required to demonstrate that the system has been coordinated and will function properly as a system. Drawings shall include schematic diagrams, equipment rack details, elevation drawings of telecommunications equipment, outlet face plate details for all outlet configurations, sizes and types of all cables, and conduits. Drawings shall show proposed layout and anchorage of equipment and appurtenances, and equipment relationship to other parts of the work including clearance for maintenance and operation.

5-2.4.2. SD-03 Product Data

5-2.4.2.1. Record Keeping and Documentation; G

5-2.4.2.2. Documentation on cables and termination hardware in accordance with EIA ANSI/TIA/EIA-606.

5-2.4.3. Spare Parts; FIO

5-2.4.3.1. Lists of spare parts, tools, and test equipment for each different item of material and equipment specified, after approval of detail drawings, not later than 2 months prior to the date of beneficial occupancy. The data shall include a complete list of parts and supplies, with current unit prices and source of supply, and a list of spare parts recommended for stocking.

5-2.4.4. Manufacturer's Recommendations; G

5-2.4.4.1. Where installation procedures, or any part thereof, are required to be in accordance with the recommendations of the manufacturer of the material being installed, printed copies of these recommendations, prior to installation shall be provided. Installation of the item will not be allowed to proceed until the recommendations are received and approved.

5-2.4.5. Test Plan; G

5-2.4.5.1. Test plan defining the tests required to ensure that the system meets technical, operational and performance specifications, 60 days prior to the proposed test date. The test plan must be approved before the start of any testing. The test plan shall identify the capabilities and functions to be tested, and include detailed instructions for the setup and execution of each test and procedures for evaluation and documentation of the results.

5-2.4.6. Qualifications; G

5-2.4.6.1. The qualifications of the Manufacturer, Contractor, and the Installer to perform the work specified herein. This shall include proof of the minimum qualifications specified herein.

5-2.4.7. SD-06 Test Reports

5-2.4.7.1. Test Reports; FIO

5-2.4.7.2. Test reports in booklet form with witness signatures verifying execution of tests. Test results will also be provided on 89 mm diskettes in ASCII format. Reports shall show the field tests performed to verify compliance with the specified performance criteria. Test reports shall include record of the physical parameters verified during testing. Test reports shall be submitted within 7 days after completion of testing.

5-2.4.8. SD-07 Certificates

5-2.4.8.1. Premises Distribution System; FIO

a) Written certification that the premises distribution system complies with the EIA ANSI/TIA/EIA-568-B.2-1, EIA ANSI/TIA/EIA-569-A, and EIA ANSI/TIA/EIA-606 standards.

5-2.4.8.2. Materials and Equipment; G

a) Where materials or equipment are specified to conform, be constructed or tested to meet specific requirements, certification that the items provided conform to such requirements. Certification by a nationally recognized testing laboratory that a representative sample has been tested to meet the requirements, or a published catalog specification statement to the effect that the item meets the referenced standard, will be acceptable as evidence that the item conforms. Compliance with these requirements does not relieve the Contractor from compliance with other requirements of the specifications.

5-2.4.9. Installers; G

5-2.4.9.1. The Contractor shall submit certification that all the installers are factory certified to install and test the provided products.

5-2.4.10. SD-11 Closeout Submittal

5-2.4.10.1. As-built Drawings; G

a) Record drawings for the installed wiring system infrastructure per EIA ANSI/TIA/EIA-606. The drawings shall show the geographic location of all cable terminations and location and routing of all backbone and horizontal cables. The identifier for each termination and cable shall appear on the drawings. Include all detailed termination diagrams including pair identities, cable sizes, and wire gauge. Provide autocad and .pdf files of the as-built drawings to the Government. Also include catalog cuts indicating options provided for all materials, apparatus, and equipment.

5-2.5 COORDINATED POWER SYSTEM PROTECTION

5-2.5.1. SD-03 Product Data

5-2.5.1.1. Fault Current Analysis; G

5-2.5.1.2. Protective Device Coordination Study; G

5-2.5.1.3. The study along with protective device equipment submittals. No time extensions or similar contact modifications will be granted for work arising out of the requirements for this study. Approval of protective devices proposed will be based on recommendations of this study. The Government shall not be held responsible for any changes to equipment, device ratings, settings, or additional labor for installation of equipment or devices ordered and/or procured prior to approval of the study.

5-2.5.1.4. Equipment; G

a) Data consisting of manufacturer's time-current characteristic curves for individual protective devices, recommended settings of adjustable protective devices, and recommended ratings of non-adjustable protective devices.

5-2.5.1.5. System Coordinator; G

a) Verification of experience and license number, of a registered Professional Engineer with at least 7 years of current experience in the design of coordinated power system protection. Experience data shall include at least five references for work of a magnitude comparable to this contract, including points of contact, addresses and telephone numbers. This engineer must perform items required by this section to be performed by a registered Professional Engineer.

5-2.5.1.6. Protective Relays; G

a) Data shall including calibration and testing procedures and instructions pertaining to the frequency of calibration, inspection, adjustment, cleaning, and lubrication.

5-2.5.2. Installation; G

5-2.5.2.1. Procedures including diagrams, instructions, and precautions required to properly install, adjust, calibrate, and test the devices and equipment.

5-2.6 SD-06 Test Reports

5-2.6.1. Field Testing; G

5-2.6.1.1. The proposed test plan, prior to field tests. Plan shall consist of complete field test procedure including tests to be performed, test equipment required, and tolerance limits, including complete testing and verification of the ground fault protection equipment, where used. Performance test reports in booklet form showing all field tests performed to adjust each component and all field tests performed to prove compliance with the specified performance criteria, upon completion and testing of the installed system. Each test report shall indicate the final position of controls.

5-2.7 SD-07 Certificates

5-2.7.1. Devices and Equipment; G

5-2.7.2. Certificates certifying that all devices or equipment meet the requirements of the contract documents.

5-3 Demolition

5-3.1 Repair portions of the site or surrounding areas that are damaged or left unfinished because of the demolition work. Patch, repair, and finish all surfaces and structures to match the surrounding conditions.

5-3.2 Repair or replace all existing structures, equipment, cables, or utilities that may be damaged during the course of construction or during the demolition phase of this project to a condition that is equal or better than the existing condition. The scope of the repair or replacement work shall be defined and completed to the satisfaction of the Contracting Officer subject to the provisions of this specification. The work shall be completed in the most timely manner in order to minimize any outages to the users.

5-3.3 Abandon existing conduits in the ground. Pull out any wires from these conduits back to the source or as directed by the Contracting Officer.

5-3.4 Restore to its original condition any landscaping that is disturbed or removed due to the new work. Document with pictures prior to any demolition the condition of the site. Submit copies of these color pictures to the Contracting Officer prior to the start of demolition. The Contracting Officer will be the sole determinant if the restoration matches the prior condition based on the pictures. If pictures are not submitted, the contractor shall restore the site per the Contracting Officer's instructions.

5-3.5 Maintain power to the 120/208V power panel in the existing Backstation Vault in B1072. This panel power lights, receptacles, and the sump pump in the cable vault below.

5-4 Power Materials and Methods

5-4.1 Primary Power - The 11.5 kV power originates from the existing Hickam Front Station.

5-4.2 Stand alone sub-metering – Provide "turtle" compliant automated electronic metering by Hunt Technologies per base standards. See www.turtletech.com additional for information. Coordinate requirements with base via the Contracting Officer.

5-4.3 General Power Requirements

5-4.3.1. Voltage drop of all internal feeders to panels shall not exceed 3% and the drop including feeders and branch circuits to the farthest outlet shall not exceed 5% per NEC 215.

5-4.3.2. Provide as a minimum 30% growth for each panelboard.

5-4.3.3. Perform a coordination and short circuit study and provide adequate short circuit withstand ratings for all apparatus and devices, and ensure that the distribution system overcurrent protection devices are properly sized and coordinated. The calculated short circuit available at any apparatus shall not be more than 80% of the symmetrical short circuit rating of the apparatus. Series rated breakers shall comply with the NEC.

5-4.3.4. The calculated demand on any transformer shall not exceed 80% of its open-air rating.

5-4.3.5. Loads shall be circuited to the nearest panel. Loads that are geographically arranged or similar in function can be consolidated into one panel that is located centrally to the loads.

5-4.4 Enclosures for electrical equipment mounted in exterior locations shall be NEMA Type 4X, stainless steel. All mounting hardware including steel channel, nuts, bolts, hardware shall be stainless steel.

5-4.5 All exterior padmounted enclosures and hardware shall be stainless steel.

5-4.6 All power apparatus including switches and receptacles shall be UL Listed and be specification grade.

5-4.7 Provide power to all electrically powered equipment provided under this and other sections of this specification and drawings whether specifically shown or not.

5-4.8 GFI Receptacles

5-4.8.1. All GFI receptacles shall comply with UL 943. Providing GFI protection to downstream devices from one GFI device upstream is not acceptable. Each receptacle requiring GFI protection shall be protected internally by an integral GFI module.

5-4.8.2. All exterior mounted receptacles shall be GFI and weatherproof. Weatherproof covers shall be UL listed as weatherproof while in use.

5-4.9 Panel boards

5-4.9.1. All panel boards shall comply with UL 67 and UL 50

5-4.9.2. Provide as a minimum 30% of each panelboard as spare breakers or PFBs.

5-4.9.3. Panel boards shall be provided with not less than 24 poles unless specifically shown otherwise.

5-4.9.4. Provide with nameplates, copper phase and ground buses, full sized copper neutral buses, bolt-on breakers, typed directories, and shall have an adequate short circuit rating for the calculated available fault level.

5-4.9.5. All new panel boards shall be keyed alike.

5-4.9.6. If series rated panels are provided, placards shall be installed on each panel warning that the panel is series rated. Include on the placard, the upstream breaker manufacturer and model type, and the downstream breaker manufacturer and model type.

5-5 Grounding

5-5.1 Grounding and Bonding Equipment, UL 467.

5-5.2 Provide a separate green ground wire sized per the NEC and run with the phase conductors for all feeders and branch circuits.

5-5.3 Grounding shall comply with the requirements of the NEC Article 250.

5-6 Wiring Methods

5-6.1 All wiring shall be in steel conduit or electrical metallic tubing (interior locations only) above grade or above the floor slab, and schedule 40 PVC concrete encased below grade except where specifically allowed by this specification. All surface exterior conduits or conduit mounted in locations subject to damage shall be galvanized rigid steel or PVC coated rigid steel.

5-6.2 Do not combine more than four single phase circuits together in one conduit. Do not combine more than one three phase circuit in the same conduit.

5-6.3 Conduit and Raceway

5-6.3.1. Rigid Metallic Conduit: Rigid Steel Conduit (Zinc-Coated), ANSI C80.1, UL 6.

5-6.3.2. Rigid Nonmetallic Conduit: Schedule 40 PVC, in accordance with NEMA TC 2

5-6.3.3. Intermediate Metal Conduit (IMC): UL 1242, zinc-coated steel only.

5-6.3.4. Electrical Metallic Tubing (EMT): UL 797, ANSI C80.3.

5-6.3.5. Plastic-Coated Rigid Steel and IMC Conduit: NEMA RN 1, Type 40 (40 mils thick).

5-6.3.6. Flexible Metal Conduit: UL 1.

5-6.3.7. Liquid-Tight Flexible Metal Conduit, Steel: UL 360.

5-6.3.8. Fittings for Metal Conduit, EMT, and Flexible Metal Conduit: UL 514B. Ferrous fittings shall be cadmium- or zinc-coated in accordance with UL 514B.

5-6.3.9. Fittings for Rigid Metal Conduit and IMC: Threaded-type. Split couplings unacceptable.

5-6.3.10. Fittings for EMT: Steel compression type.

5-6.3.11. Fittings for Rigid Nonmetallic Conduit: NEMA TC 3.

5-6.3.12. Liquid-Tight Flexible Nonmetallic Conduit: UL 1660.

5-6.4 Outlet Boxes and Covers: UL 514A or UL 514C

5-6.5 Wires and Cables: Wires and cables shall meet applicable requirements of NFPA 70 and UL. Aluminum conductors shall not be used.

5-6.5.1. Minimum Conductor Sizes: Minimum size for branch circuits shall be No. 12 AWG; for Class 1 remote control and signal circuits, No. 14 AWG; for Class 2 low-energy, remote control and signal circuits, No. 16 AWG; and for Class 3 low-energy, remote control, alarm and signal circuits, No. 22 AWG.

5-6.5.2. Color Coding: Provide for service, feeder, branch, control, and signaling circuit conductors. Color shall be green for grounding conductors and white for neutrals; except where neutrals of more than one system are installed in same raceway or box, other neutral shall be white with colored (not green) stripe. Color of ungrounded conductors in different voltage systems shall be as follows:

208/120 volt, three-phase

Phase A – black
Phase B – red
Phase C – blue

480/277 volt, three-phase

Phase A – brown
Phase B – orange
Phase C – yellow

5-6.6 Cables

5-6.6.1. Medium voltage cables shall be MV105, EPR insulated, with overall PVC jacket, 133% rating, copper conductors with filled strand, 15 kV, and as required below.

5-6.6.2. Low voltage cables shall be THWN-2, THHN-2, or XHHW-2, 90 degree rated.

5-6.6.3. Material

5-6.6.3.1. Conductors shall conform to all the applicable requirements of Part 2 of NEMA WC 8 as applicable and shall be annealed copper. Copper conductors may be bare, or tin- or lead-alloy-coated, if required by the type of insulation used.

5-6.6.4. Size

5-6.6.4.1. Minimum wire size shall be No. 12 AWG for power and lighting circuits; No. 10 AWG for current transformer secondary circuits; No. 14 AWG for potential transformer, relaying, and control circuits; No. 16 AWG for annunciator circuits; and No. 19 AWG for alarm circuits. Minimum wire sizes for rated circuit voltages of 2,001 volts and above shall not be less than those listed for the applicable voltage in Part 3 of NEMA WC 8, as applicable.

5-6.6.5. Stranding

5-6.6.5.1. Conductor stranding classes cited herein shall be as defined in NEMA WC 8, as applicable. Lighting conductors No. 10 AWG and smaller shall be solid or have Class B stranding. Any conductors used between stationary and moving devices, such as hinged doors or panels, shall have Class H or K stranding. All other conductors shall have Class B or C stranding, except that conductors shown on the drawings, or in the schedule, as No. 12 AWG may be 19 strands of No. 25 AWG, and conductors shown as No. 10 AWG may be 19 strands of No. 22 AWG.

5-6.6.6. Conductor Shielding

5-6.6.6.1. Conductor shielding conforming to NEMA WC 8, as applicable, shall be used on power cables having a rated circuit voltage above 2,000 volts. In addition, conductor shielding for shielded cables shall also comply with Section C of AEIC CS5 or AEIC CS6. Strict precautions shall be taken after application of the conductor shielding to prevent the inclusion of voids or contamination between the conductor shielding and the subsequently applied insulation.

5-6.6.7. Separator Tape

5-6.6.7.1. Where conductor shielding, strand filling, or other special conductor treatment is not required, a separator tape between conductor and insulation is permitted.

5-6.6.8. Insulation

5-6.6.8.1. Insulation shall be an ethylene-propylene rubber (EPR) type meeting the requirements of Part 3 of NEMA WC 8. For shielded cables of rated circuit voltages above 2,000 volts, the following provisions shall also apply:

a) Insulation shall be chemically bonded to conductor shielding.

b) The insulation material and its manufacturing, handling, extrusion and vulcanizing processes, shall all be subject to strict procedures to prevent the inclusion of voids, contamination, or other irregularities on or in the insulation. Insulation material shall be inspected for voids and contaminants. Inspection methods, and maximum allowable void and contaminant content shall be in accordance with Section B of AEIC CS5 or AEIC CS6, as applicable.

c) Cables with repaired insulation defects discovered during factory testing, or with splices or insulation joints, are not acceptable.

5-6.6.9. Insulation Thickness

5-6.6.9.1. The insulation thickness for each conductor shall be based on its rated circuit voltage.

5-6.6.9.2. Power Cables/Single-Conductor Control Cables, 2,000 Volts and Below - The insulation thickness for single-conductor cables rated 2,000 volts and below shall be as required by Table 3-1, Part 3, of NEMA WC 8. NEMA WC 8 ethylene-propylene rubber-insulated conductors shall have a PVC jacket. Column "B" thickness shall apply to single-conductor cables that require a jacket and to individual conductors of multiple-conductor cables with an overall jacket.

5-6.6.9.3. Power Cables, Rated 2,001 Volts and Above - Thickness of insulation for power cables rated 2,001 volts and above shall be in accordance with the following:

a) Shielded cables rated 2,001 volts and above shall comply with Column B of Table B1, of AEIC CS5 or AEIC CS6, as applicable.

b) Multiple-Conductor Control Cables - The insulation thickness of multiple-conductor cables used for control and related purposes shall be as required by Table 7.5.1 of NEMA WC 8 as applicable.

5-6.6.9.4. Insulation Shielding

a) Unless otherwise specified, insulation shielding shall be provided for conductors having rated circuit voltages of 2,001 volts and above. The voltage limits above which insulation shielding is required, and the material requirements, are given in Part 4 of NEMA WC 8, as applicable. The material, if thermosetting, shall meet the wafer boil test requirements as described in Section D of AEIC CS5 or AEIC CS6, as applicable. The method of shielding shall be in accordance with the current practice of the industry; however, the application process shall include strict precautions to prevent voids or contamination between the insulation and the nonmetallic component. Voids, protrusions, and indentations of the shield shall not exceed the maximum allowances specified in Section C of AEIC CS5 or AEIC CS6, as applicable. The cable shall be capable of operating without damage or excessive temperature when the shield is grounded at both ends of each conductor. All components of the shielding system shall remain tightly applied to the components they enclose after handling and installation in accordance with the manufacturer's recommendations. Shielding systems which require heat to remove will not be permitted unless specifically approved.

5-6.6.10. Jackets

5-6.6.10.1. All cables shall have jackets meeting the requirements of Part 4 of NEMA WC 8, as applicable, and as specified herein. Individual conductors of multiple-conductor cables shall be required to have jackets only if they are necessary for the conductor to meet other specifications herein. Jackets of single-conductor cables and of individual conductors of multiple-conductor cables, except for shielded cables, shall be in direct contact and adhere or be vulcanized to the conductor insulation. Multiple-conductor cables and shielded single-conductor cables shall be provided with a common overall jacket, which shall be tightly and concentrically formed around the core. Repaired jacket defects found and corrected during manufacturing are permitted if the cable, including jacket, afterward fully meets these specifications and the requirements of the applicable standards.

5-6.6.10.2. Jacket Material

The jacket shall be PVC due to its good performance in environments that contain JP-8.

5-6.6.10.3. Jacket Thickness

a) The minimum thickness of the jackets at any point shall be not less than 80 percent of the respective nominal thicknesses specified below. Single-Conductor Cables - if shielded, shall have a jacket thickness in accordance with the requirements of Part 4, Table 4-3 of NEMA WC 8.

5-6.7 Device Plates: Provide UL listed, one-piece device plates for outlets to suit the devices installed. For metal outlet boxes, plates on unfinished walls shall be of zinc-coated sheet steel or cast metal having round or beveled edges. Plates on finished walls shall be satin finish stainless steel or brushed-finish aluminum, minimum 0.76 (0.03 inch) thick. Screws shall be machine-type with countersunk heads in color to match finish of plate. Test device plates for compliance with UL 514A and UL 514C for physical strength.

5-6.8 Switches: Toggle Switches, UL 20 or NEMA WD 1

5-6.8.1. Disconnect Switches: NEMA KS 1

5-6.9 Receptacles: UL 498 and NEMA WD 1, 20 amp rated minimum

5-6.10 Circuit Breakers: UL 489

5-7 Main Electric Supply Station and Substation

5-7.1 Nameplates

5-7.1.1. Each major component of this specification shall have the manufacturer's name, address, type or style, model or serial number, and catalog number on a nameplate securely attached to the equipment. Nameplates shall be made of noncorrosive metal. As a minimum, nameplates shall be provided for transformers, regulators, circuit breakers, capacitors, meters, switches, switchgear, and grounding resistors.

5-7.2 Corrosion Protection

5-7.2.1. Aluminum shall not be used. Ferrous metal hardware shall be hot-dip galvanized in accordance with ASTM A 153/A 153M and ASTM A 123/A 123M.

5-7.2.2. Equipment and component items, including but not limited to transformer stations and ferrous metal luminaires not hot-dip galvanized or porcelain enamel finished, shall be provided with corrosion-resistant finishes which shall withstand 480 hours of exposure to the salt spray test specified in ASTM B 117 without loss of paint or release of adhesion of the paint primer coat to the metal surface in excess of 1/16 inch from the test mark. The scribed test mark and test evaluation shall be in accordance with ASTM D 1654 with a rating of not less than 7 in accordance with TABLE 1, (procedure A). Cut edges or otherwise damaged surfaces of hot-dip galvanized sheet steel or mill galvanized sheet steel shall be coated with a zinc rich paint conforming to the manufacturer's standard.

5-7.3 Substation Equipment

5-7.3.1. The installation shall be of the switching station radial type. The initial capacity of the substation is based on the HECO transformer capacity shown. The number of outgoing distribution feeders shall be as shown. Outgoing circuits shall be three-phase four-wire type with an insulated neutral having a voltage rating of 11.5 kV phase-to-phase. The insulated neutral shall have insulation rated not less than 1000 volts. Outgoing circuit equipment shall be rated for a nominal voltage class of 15 kV and shall have a BIL of not less than 95 kV. Outgoing circuits shall leave the station underground.

5-7.3.2. Metal-enclosed bus shall have ratings that equal or exceed the ratings of the buses, circuit breakers, and switchgear to which the bus is connected, unless otherwise indicated. The bus shall conform to the requirements of IEEE C37.23. Bus shall be of the nonsegregated-phase type. A ground bus is not required. A neutral bus is required. The enclosure is to be the nonventilated type constructed of selected smooth sheet steel, and shall be equipped with continuously energized space heaters (with high-temperature thermal protection) to prevent condensation over an ambient temperature range of minus 20 to 104 degrees F. The finish of the enclosure shall be in accordance with the manufacturer's standard. The finish, type, and gauge of the metal enclosure and the details of transitional elements and connections and the lengths and ratings of the bus and enclosure proposed shall be as shown on detail drawings.

5-7.4 Metal Clad Switchgear

5-7.4.1. Switchgear shall comply with NEMA SG 5 and IEEE C37.20.2 and shall be of the indoor type consisting of incoming line, tie, auxiliary compartments and feeder circuit breaker units. Compartments shall be provided to accommodate specified or indicated auxiliary equipment. The indicated number of active and future circuit breakers and equipped cubicles shall be provided. Two-high circuit breaker units shall be provided. When two-high circuit breaker units are installed, equipped space units shall be provided when necessary to make adjacent sections equal in height. Units denoted as equipped space or future shall consist of items of equipment listed for the basic unit in NEMA SG 5, except the power circuit breaker shall not be provided. Current transformers, instruments, instrument switches, and relays shall be provided for equipped space or future units as shown. Continuous current rating of equipped space units shall match the most common basic breaker unit ampere rating used elsewhere in the associated switchgear unless otherwise indicated. Switchgear shall be vented according to the manufacturer's standard practice. Intake and exhaust openings shall be screened. Switchgear shall have relaying as shown. The control voltage shall be 125 V dc.

5-7.4.2. All instrumentation including relays, CTs, and PTs, shall be coordinated and designed to function accurately as a system. All accuracies, classes, burdens, and ratings indicated in this specification is intended only as a minimum standard. The engineer of record is responsible to coordinate and specify higher values if required to ensure a properly working system.

5-7.4.3. Phase Rotation

5-7.4.3.1. Ensure that the Mamala Substation and the Front Station have the same phasing and phase rotation for parallel operation.

5-7.4.4. Ratings

5-7.4.4.1. Main buses shall be three-phase four-wire with a continuous current rating of 2000 amperes rms and no less than 500 mVA short circuit rating. The neutral bus shall be rated for 2000 amperes, continuous. Switchgear ratings at 60 Hz shall be in accordance with ANSI C37.06 and as follows:

Maximum voltage.................................11.5 KV

Nominal voltage class............................15 KV

BIL..95 KV

Maximum symmetrical interrupting current.........minimum 500 mVA or as determined by short circuit study

3-second short-time current......................23,000A

Continuous current..............................2000A

5-7.4.5. Circuit Breakers

5-7.4.5.1. Circuit breakers shall comply with IEEE C37.04 and ANSI C37.06 and shall consist of items listed for such units in NEMA SG 5. Where indicated, bus or lug connections to mount field-installed, slip-on, medium-voltage cable terminations for cable entering from below and a bus throat for connection to the associated metal-enclosed bus shall be provided. Circuit breakers shall be of the vacuum drawout type having electrically charged, stored-energy mechanisms which are mechanically and electrically trip free. A means for manual charging of each trip mechanism shall be provided. Circuit breakers of the same ampere rating shall be interchangeable, both mechanically and electrically. [Each circuit breaker shall have a cell-mounted switch assembly for control and interlocking.] [Cell switches may be connected either in parallel or in series with control contacts that are used for interlocking, but either connection shall permit operation of a circuit breaker when it is in a test position.] In addition to any contacts used or shown, each circuit breaker shall be provided with four spare auxiliary [and cell contacts], two normally open and two normally closed, wired to interconnection terminals. If auxiliary relays are used to provide additional contacts, such relays shall not be of the latching type.

Interconnection terminal blocks shall be wired to permit remote open and close operations of each circuit breaker and for other required exterior connections or connections between switchgear sections.

5-7.4.6. Vacuum Circuit Interrupters

5-7.4.6.1. Vacuum interrupters shall be hermetically-sealed in a high vacuum to protect contacts from moisture and contamination. Circuit breakers shall have provisions for maintenance slow closing of contacts and have a readily accessible contact wear indicator. Tripping time shall not exceed 5 cycles.

5-7.4.7. Buses

5-7.4.7.1. Copper bus shall comply with ASTM B 188. Bolted or pressure joints for main and ground buses, interconnections, and external connections to equipment shall be of the silver-to-silver or the silver-to-tin high-pressure type. Bolted connections shall have a minimum of two bolts, except for the ground bus where one bolt will suffice. Each nut on any bolted connection shall be secured with a belleville washer or other locking means torqued in accordance with manufacturer's recommendations. Bus supporting elements shall be bolted to switchgear enclosures and shall comply with IEEE C37.20.2.

5-7.4.7.2. Main Buses

a) Main buses and connections shall have at least the same short-circuit current rating as circuit breakers. Buses shall be copper and fully insulated along its entire length.

5-7.4.7.3. Ground Buses

a) Uninsulated copper ground buses, not less than 2 inches x 1/4 inch in cross-sectional area, shall be provided for the full length of a switchgear lineup. Ground buses of aluminum are not acceptable. The short-circuit current rating of the ground bus shall be at least equal to the short circuit current rating of the primary bus. Compression indent type cable lugs shall be provided at each end of a ground bus for connection of copper ground cables of size as shown on plan.

5-7.4.7.4. Control Buses

a) Control buses shall be provided as necessary to supply power to control devices. Buses shall get their power from control power transformers.

5-7.4.8. Control Power Transformers

5-7.4.8.1. Control power transformers shall comply with IEEE C57.12.01, shall be of the ventilated dry type, and shall provide 240/120-volt, single-phase electric power for station ac control power requirements. The transformer primary voltage rating shall be 11.5 kV and the transformer capacity shall be as indicated. The BIL rating shall equal or exceed the BIL rating of the switchgear. Transformer current-limiting primary fuses shall be drawout type and shall be interlocked with a secondary molded case circuit breaker provided as a part of the transformer installation. Molded case circuit breakers shall comply with NEMA AB 1. It shall not be possible to open the primary fuse compartment unless this secondary circuit breaker is in the open position. Construction shall be of the drawout type for either the complete assembly or for primary fuses only, according to the manufacturer's standard. Mechanical interlocks shall prevent removal of primary fuses, unless the associated assembly is in a drawout or disconnected position. Transformer compartments shall have hinged doors.

5-7.5 Substation and Switchgear Protective Relays

5-7.5.1. General

5-7.5.1.1. Solid-state or Microprocessor-based protective relays shall be provided as shown and shall be of a type specifically designed for use on power switchgear or associated electric power apparatus. Protective relays shall conform to IEEE C37.90. Relays and auxiliaries shall be suitable for operation with the instrument transformer ratios and connections provided.

5-7.5.2. Construction

5-7.5.2.1. Relays shall be of the semi-flush, rectangular, back-connected, dustproof, switchboard type. Cases shall have a black finish and window-type removable covers capable of being sealed against tampering. Relays shall be of a type that can be withdrawn, through approved sliding contacts, from fronts of panels or doors without opening current transformer secondary circuits, disturbing external circuits, or requiring disconnection of any relay leads. Necessary test devices shall be incorporated within each relay and shall provide a means for testing either from an external source of electric power or from associated instrument transformers. Each relay shall be provided with an operation indicator and an external target reset device. Relays shall have necessary auxiliaries for proper operation. Relays and auxiliaries shall be suitable for operation with the instrument transformer ratios and connections provided.

5-7.5.3. Ratings

5-7.5.3.1. Relays shall be the manufacturer's standard items of equipment with appropriate ranges for time dial, tap, and other settings. Relay device numbers shall correspond to the function names and descriptions of IEEE C37.2.

5-7.5.4. Overcurrent Relays

5-7.5.4.1. Overcurrent relays shall be as follows:

a) Phase overcurrent relays for main and tie circuit breakers shall be single-phase, nondirectional, solid state or microprocessor-based type, time delay, device 51, current taps as indicated with characteristic curves that are per the coordination study.

b) Ground overcurrent relays for main circuit breakers shall be nondirectional, solid-state or microprocessor-based type, time delay, device 51N, residually connected, with current taps as indicated and with characteristic curves that are per the coordination study.

c) Ground overcurrent relays for tie circuit breakers shall be nondirectional, solid-state or microprocessor-based type, time delay, device 51N, residually connected, with current taps as indicated and with characteristic curves that are per the coordination study.

d) Phase overcurrent relays for feeder circuit breakers shall be single-phase, nondirectional, solid-state or microprocessor -based type, time delay, device 50/51, with instantaneous-current pick-up range as indicated, with time-delay-current taps and characteristic curves that are per the coordination study.

e) Ground overcurrent relays for feeder circuit breakers shall be nondirectional, solid-state or microprocessor-based type instantaneous, device 50N, residually connected, with current pick-up range as indicated.

5-7.5.5. Directional Overcurrent Relays

5-7.5.5.1. Directional overcurrent relays shall be as follows:

a) Directional phase overcurrent relays shall be single-phase, solid-state or microprocessor-based type with instantaneous units. Phase relays, device 67, shall have an instantaneous-current pick-up range as indicated, with time-delay-current taps and with characteristic curves that are per the coordination study.

b) Directional ground overcurrent relays, device 67N, shall have an instantaneous-current pick-up range as indicated, with time-delay-current taps and with characteristic curves that are per the coordination study.

5-7.5.6. Bus Differential and Lockout Relays

5-7.5.6.1. Bus differential relay, device 87A and 87B, shall be of the three-phase or single-phase, high-speed impedance differential type suitable for protection of buses. Lockout relay, device 86 A and 86B, shall be of a type which, when used in conjunction with the 87A and 87B relays respectively, trips and locks out the indicated circuit breaker.

5-7.6 Control and Instrument Switches

5-7.7 Control and instrument switches shall be of the rotary switchboard type rated for alternating-current operation at 600 volts, or direct-current operation at 250 volts for dc circuits, as applicable. Contacts shall be rated for not less than a continuous current of 20 amperes, shall be of the silver-to-silver type, and shall have positive means for maintaining contact. Each switch shall be provided with a black operating handle, and an escutcheon clearly marked to show each operating position. Switch identifications and handle positions shall be engraved on escutcheons or may be provided on separate nameplates. Escutcheon engravings shall be white on a black background or black on a white background. Instrument switches for potential phase selection shall be provided with an oval handle. Ammeter switches for phase selection shall have round, notched, or knurled handles and equipped with short-circuiting type of contacts to prevent open-circuiting of current transformer secondary circuits in any position of the ammeter switches. Switches provided for circuit breaker control and local-remote selector switches shall have a pistol-grip handle and a mechanical target to indicate the last operating position of the switch. Red and green circuit breaker position indication LED lights shall be installed immediately above each circuit breaker switch. Local-remote selector switches shall be provided only when shown or specified. Position indication lights shall be installed immediately above selector switches, with blue LED lights indicating remote control and amber LED lights indicating local control.

5-7.8 Electrical Indicating Instruments

5-7.8.1. Electrical indicating instrument relays shall comply with ANSI C12.1, ANSI C12.4, ANSI C12.10, and ANSI C39.1. Electrical instrumentation devices shall be compatible as a system, sealed, dust and water tight, utilize modular components with metal housings and digital instrumentation. Date display shall utilize LED or back-lit LCD.

5-7.8.2. Wattmeters

5-7.8.2.1. Wattmeters shall comply with ANSI C12.1 and ANSI C12.10 except for mounting and shall be the three-phase, four-wire type with three current coils and three potential coils.

5-7.8.3. Varmeters

5-7.8.3.1. Varmeters shall be the center-zero type and provided with integral or separate phase-shifting transformers or compensators. Varmeter shall be the three-phase, four-wire type with three current coils and three potential coils. Varmeters shall have dial markings and be so wired that incoming VAR readings shall be to the left of zero and outgoing VAR readings shall be to the right of zero. Dials shall be so labeled.

5-7.8.4. Ammeters and Ammeter Switches

5-7.8.4.1. Ammeters shall be calibrated to indicate full-load current when supplied with a current of 5 amperes. Full-load current shall be indicated by the pointer at approximately 75 percent of the full-scale range. Ammeter switches shall be of the short-circuiting type provided with an off position, wired for indication of current in each phase, and shall be provided for each ammeter shown or specified.

5-7.8.5. Voltmeters and Voltmeter Switches

5-7.8.5.1. Voltmeters shall be provided with expanded scales and calibrated to indicate the nominal phase-to-phase and phase-to-neutral voltages at approximately mid-scale. A voltmeter switch shall be provided with an off position, wired for indication of applicable voltages, and shall be provided for each voltmeter shown or specified.

5-7.8.6. Demand Registers

5-7.8.6.1. Demand registers shall comply with ANSI C12.4.

5-7.8.7. Accumulative Meters

5-7.8.7.1. Accumulative type meters shall be provided as shown to measure real and reactive power consumed, and shall be rated for use with instrument transformers shown.

5-7.8.8. Construction

5-7.8.8.1. Meters shall be of the semiflush, back-connected, dustproof, drawout switchboard type. Cases shall have black finish and window-type removable covers capable of being sealed against tampering. Meters shall be of a type that can be withdrawn, through approved sliding contacts, from fronts of panels or doors without opening current-transformer secondary circuits, disturbing external circuits, or requiring disconnection of any meter leads. Necessary test devices shall be incorporated within each meter and shall provide means for testing either from an external source of electric power or from associated instrument transformers.

5-7.8.9. Test Blocks and Accessories

5-7.8.9.1. Test blocks and their associated testing accessories shall be provided for testing of instruments and protective relays that require periodic testing or calibration in-place, but which are not equipped with integral testing features. Test blocks with covers shall be mounted near the base of the switchgear unit beneath the devices to be tested, and shall be provided with a nameplate engraved to identify individual current or potential test blocks, or a combination current/potential test block, as applicable. Combination test blocks shall not exceed 10 poles. Current test blocks shall be the short-circuiting type. Test devices shall be provided for insertion into the associated test block to permit application of the proper current or potential source for testing and calibration. Test devices shall be rated not less than 20 amperes and 125 volts dc.

5-7.9 Specific Unit Requirements

5-7.9.1. In addition to the basic circuit breaker unit requirement listed in NEMA SG 5, each individual unit or section shall contain other devices as required for the application. The following requirements are not to be considered complete in every detail and miscellaneous equipment and devices necessary for correct operation, as indicated or specified, shall be provided as necessary. Protective relays, meters, instruments, and control and instrument switches, shall be mounted on a unit or compartment door.

5-7.10 Miscellaneous Items

5-7.10.1. Accessories

5-7.10.1.1. Accessories identified in NEMA SG 5 shall be provided for the inspection, testing, maintenance, and repair of circuit breakers, and shall include one set of any special tools, as necessary to repair and maintain circuit breakers and major switchgear components. Maintenance and testing accessories shall include, but are not limited to the following:

a. Portable gear motor for electric-power positioning of circuit breakers, if required by the breaker design.

b. Secondary test coupler for testing of drawout circuit breakers in the test position.

c. Hand crank for positioning of circuit breakers.

d. Transfer truck, for movement of circuit breaker units.

e. Test cabinet for closing and tripping of circuit breakers by electrical control operations.

f. Lifting and transfer device for two-high circuit breaker units.

5-7.11 Instrument Transformers

5-7.11.1. General

5-7.11.1.1. The contractor is responsible to select and coordinate all ratings for instrument transformers with the specific relays and devices furnished. These specifications are intended to establish a level of quality, not to provide coordinated requirements. The designer shall coordinate all accuracies, burdens, and ratios to provide a complete and properly working system.

5-7.11.1.2. Instrument transformers shall comply with ANSI C12.11 and IEEE C57.13. Instrument transformers shall be configured for mounting in/on the device to which they are applied. Polarity marks on instrument transformers shall be visually evident and shown on drawings.

5-7.11.2. Current Transformers

5-7.11.2.1. Unless otherwise indicated, bar, wound, or window-type transformers are acceptable; and except for window-type units installed over insulated buses, transformers shall have a BIL rating consistent with the rated BIL of the associated switchgear or electric power apparatus bushings, buses or conductors. Current transformers shall have the indicated ratios. Other thermal and mechanical ratings of current transformers and their primary leads shall be coordinated with the design of the circuit breaker and shall be not less than the momentary rating of the associated circuit breaker. Circuit protectors shall be provided across secondary leads of the current transformers to prevent the accidental open-circuiting of the transformers while energized. Each terminal of each current transformer shall be connected to a short-circuiting terminal block in the circuit interrupting mechanism cabinet, power transformer terminal cabinet, and in the associated instrument and relay cabinets.

5-7.11.3. Current Transformers for Power Transformers

5-7.11.3.1. Single-ratio bushing type current transformers shall be provided in circuit breaker bushing wells as indicated. Single-ratio units shall have a minimum metering accuracy class rating of 0.3B-0.5.

5-7.11.4. Current Transformers for Metal-Clad Switchgear

5-7.11.4.1. Single-ratio units, used for metering and relaying, shall have a metering accuracy class rating of 0.3 B.0.5. Single-ratio units, used only for relaying, shall have a minimum relaying accuracy class rating of C200 for a C classification.

5-7.11.5. Current Transformers for Kilowatthour and Demand Metering

5-7.11.5.1. Current transformers shall conform to IEEE C57.13. Provide current transformers with a metering accuracy Class of 0.3 through B-0.5 (1200A) or B-1.8 (2000A) as shown on drawings, with a minimum RF of 1.5 at 30 degrees C, with 600-volt insulation, and 10 kV BIL. Size current transformers as indicated. Provide butyl-molded window type current transformers mounted in the current transformer cabinet.

5-7.11.6. Voltage Transformers

5-7.11.6.1. Voltage transformers shall have indicated ratios. Accuracy shall be as coordinated with the system design. Voltage transformers shall be of the drawout type having current-limiting fuses in both primary and secondary circuits. Mechanical interlocks shall prevent removal of fuses, unless the associated voltage transformer is in a drawout position. Voltage transformer compartments shall have hinged doors.

5-7.12 Auxiliary Substation Equipment

5-7.12.1. Automatic Transfer/Bypass and Isolation Switches

5-7.12.1.1. Applicable sections of IEEE C37.90.1, IEEE C37.13, IEEE C602.41, IEEE Std. 602, NEMA ICS 2, NEMA ICS 10, UL 1008 and UL 1066.

5-7.12.2. Station Battery

5-7.12.2.1. The station battery installation shall include a battery, battery racks, a battery charger, and protective equipment. The station battery installation shall be housed where indicated.

5-7.12.2.2. Battery

a) The battery shall consist of the required number of lead-calcium cells interconnected with proper connectors provided by the battery manufacturer to provide a nominal battery rating of 125 volts. Rubber or plastic numerals, of at least 1 inch in height, shall be provided by the battery manufacturer for field attachment to permit proper cell identification. The battery shall have an ampere-hour capacity equal to at least 125 percent of the station's direct-current requirements including normal continuous loads plus intermittent loads.

Normal continuous load capacity shall be adequate for an 8-hour period. Intermittent load capacity shall be adequate so that at least three openings and three closings of each of the station's associated circuit breakers can occur in an 8-hour period with no more than three circuit breaker units simultaneously operating. Battery circuits shall be ungrounded. Batteries shall have a 20-year minimum life and a 5-year no cost replacement warranty.

5-7.12.2.3. Battery Racks

a) Battery racks shall have welded steel frames and rails finished with two coats of paint of a color matching the battery charger enclosure. Racks shall be no more than two tiers high and top tiers shall be low enough to permit maintenance to be done by personnel standing at floor level. Rails shall have a top covering of plastic or rubber at least 1/16 inch thick. Paint, rubber, and plastic shall resist corrosion and action of the electrolyte. The installation shall be provided with a portable hydrometer syringe and thermometer. Where recommended by the manufacturer, the installation shall include a cell lifter.

5-7.12.2.4. Battery Charger

a) The battery charger shall comply with UL 1236 and shall be a constant voltage, filtered, voltage-regulated, fully automatic type rated for full-float charging of the associated battery. The battery charger shall be convection cooled and suitable for operation on electric power supplied from the associated low-voltage alternating-current panelboard, shall have adequate capacity to fully recharge the associated depleted battery in not more than 8 hours while supplying normal direct-current loads, and shall have an efficiency of not less than 90 percent. The battery charger shall have input and output circuit breakers which automatically disconnect the battery charger when faults occur. The battery charger shall have an output ammeter and voltmeter, and equalizing-float selector switch, and an equalizing timer with a range of 0 to 24 hours. The battery charger enclosure shall be painted with the manufacturer's normal finish and shall be provided with wall mounting brackets or shall be free-standing as required by its size and weight. A relay for sensing loss of alternating-current input, and an adjustable relay for sensing that the battery charger output voltage has fallen to a pre-set level, shall be installed on the battery charger to actuate the associated annunciator circuits. DC ground detector LED lights shall be provided.

5-7.12.3. Protective Equipment

a) Protective equipment required by IEEE Std 484 shall be provided and installed in a free-standing cabinet mounted where indicated or directed. Water facilities required shall be of the portable type consisting of one 5 gallon tank and one 1 quart basin. The tank shall have a removable screw top and a spigot. The basin shall be suitable for rinsing eyes or skin in case of acid spillage.

5-7.13 Cabinets and Enclosures

5-7.13.1. Cabinets and enclosures shall comply with NEMA 250 and shall be of galvanized steel, shall be provided with hinged doors, and shall be suitable for indoor or outdoor installation as indicated. Where locations are not indicated, cabinets shall be suitable for outdoor installation. Thickness of metal and outdoor construction shall be in accordance with UL 50. An indoor cabinet exterior shall have one finish coat and an outdoor cabinet exterior shall have two finish coats. Finish colors shall be manufacturer's standard dark gray or sky gray for outdoor cabinets and light gray for indoor cabinets, unless otherwise specified. The finish color of outdoor equipment shall be the same unless otherwise approved. Finish coats shall be applied over a prepared substrate. Each cabinet shall be a freestanding type or may be supported by attachment to an enclosure fence or a switchgear interior wall where located adjacent thereto. A concrete pad shall be provided to support any outdoor cabinet whose base extends to within 3 inches of grade level and pads shall extend at least 4 inches below grade.

5-7.14 Danger Signs

5-7.14.1. One danger sign inscribed "DANGER-HIGH VOLTAGE" shall be permanently and securely mounted approximately 5 feet above finished grade on each outward side of the fence or building enclosure. Fasteners shall be of stainless steel. Signs shall be of metal and shall have letters of at least 3 inches in height. Voltage warning signs shall comply with IEEE C2.

5-7.15 Surge Arresters

5-7.15.1. Surge arresters shall comply with NEMA LA 1, IEEE C62.1, IEEE C62.2, and IEEE C62.11.

5-7.16 Grounding

5-7.16.1. A grounding grid, consisting of the indicated configuration of bare copper conductors and driven ground rods shall be installed as shown on the drawings. Grounding grid shall comply with IEEE Std 80. Equipment frames of metal-enclosed equipment, medium-voltage cable terminations, chain-link fencing, metal-structures, and other noncurrent-carrying metal items shall be connected to the ground grid as shown. At least two connections shall be provided from switchgear ground bus to the ground grid. Fences shall be grounded at each fixed gate post, each corner post, and at intermediate posts as indicated. Each gate section shall be bonded to its gate posts with a 1/8 x 1 inch flexible braided copper strap and ground post clamps. Fence ground clamps shall be of a type that inhibits corrosion between metal parts. Outriggers shall be grounded as shown.

5-7.16.2. Grounding Electrodes

5-7.16.2.1. Grounding electrodes shall be as follows:

a) Driven rod electrodes - Unless otherwise indicated, ground rods shall be driven into the earth until the tops of the rods are approximately one foot below finished grade.

b) Grid grounding electrodes - A grid grounding electrode shall be installed as shown consisting of bare copper conductors installed 12 inches, plus or minus 3 inches, below the finished top of soil grade. Grid conductors shall be bonded to all rod electrodes, and to all other intersecting grid conductors. Grid conductors shall be sized as shown.

5-7.16.3. Grounding and Bonding Connections

5-7.16.3.1. Connections above grade shall be made by the fusion-welding process or with bolted solderless connectors, in compliance with UL 467, and those below grade shall be made by the fusion-welding process. Where grounding conductors are connected to aluminum-composition conductors, specially treated or lined copper-to-aluminum connectors suitable for this purpose shall be used.

5-7.16.4. Grounding and Bonding Conductors

5-7.16.4.1. Grounding and bonding conductors include all conductors used to bond equipment frames and structural members to the grounding grid. Grounding and bonding conductors shall be sized as shown. After being located to provide maximum physical protection, exposed grounding conductors shall be securely attached to structural supports at not more than two foot intervals with suitable fasteners. Bends greater than 45 degrees in ground conductors are not permitted. Routing of ground conductors through concrete should be avoided. When concrete penetration is necessary, nonmetallic conduit shall be cast flush with the points of concrete entrance and exit so as to provide an opening for the ground conductor, and the opening shall be sealed with a suitable compound after installation.

5-7.16.5. Surge Arrester Grounding

5-7.16.5.1. Surge arresters and neutrals shall be bonded directly to the transformer enclosure and then to the grounding grid with a bare copper conductor, minimum size 4/0. Lead lengths shall be kept as short as practicable with no kinks or sharp bends.

5-7.17 Pre-Energization Services

5-7.17.1. Calibration, testing, adjustment, and placing into service of the installation shall be accomplished by a manufacturer's product field service engineer or independent testing company with a minimum of two years of current product experience. No part of the electrical system shall be energized until all station grounding components have been tested and demonstrated to comply with the specified requirements. The following services shall be performed on the equipment listed below. These services shall be performed subsequent to testing but prior to the initial energization. The equipment shall be inspected to insure that installation is in compliance with the recommendations of the manufacturer and as shown on the detail drawings. Terminations of conductors at station buses and at major equipment shall be inspected to ensure the adequacy of connections. Bare and insulated conductors between such terminations shall be inspected to detect possible damage caused during installation. If factory tests were not performed on completed assemblies, tests shall be performed after the installation of completed assemblies. Components shall be inspected for damage during installation or shipment and to verify that packaging materials have been removed. Components capable of being both manually and electrically operated shall be operated manually prior to the first electrical operation. Components capable of being calibrated, adjusted, and tested shall be calibrated, adjusted, and tested in accordance with the instructions of the equipment manufacturer. Items for which such services shall be provided include, but are not limited to, are the following:

Battery, station.

Breakers, circuit.

Bus, metal-enclosed.

Switchgear, metal-clad.

5-7.17.2. Operating Tests

5-7.17.2.1. After the installation is completed, and at such time as the Contracting Officer may direct, the Contractor shall conduct operating tests for approval. The equipment shall be demonstrated to operate in accordance with the requirements herein. An operating test report shall be submitted in accordance with paragraph TEST REPORTS.

5-7.17.2.2. Protective Relays

a) Protective relays shall be visually and mechanically inspected, adjusted, tested, and calibrated in accordance with the manufacturer's published instructions. Tests shall include pick-up, timing, contact action, restraint, and other aspects necessary to insure proper calibration and operation. Relay settings shall be implemented in accordance with the coordination study. Relay contacts shall be manually or electrically operated to verify that the proper breakers and alarms initiate. Relaying current transformers shall be field tested in accordance with IEEE C57.13.

5-7.17.3. Manufacturer's Field Service

5-7.17.3.1. Onsite Training

a) The Contractor shall conduct a training course for the operating staff as designated by the Contracting Officer. The training period shall consist of a total of 8 hours of normal working time and shall start after the system is functionally completed but prior to final acceptance tests. The course instruction shall cover pertinent points involved in operating, starting, stopping, servicing the equipment, as well as all major elements of the operation and maintenance manuals. Additionally, the course instructions shall demonstrate all routine maintenance operations. A VHS format video tape of the entire training session shall be submitted.

5-7.17.4. Installation Engineer

5-7.17.4.1. After delivery of the equipment, the Contractor shall furnish one or more field engineers, regularly employed by the equipment manufacturer to supervise the installation of the equipment, assist in the performance of the onsite tests, initial operation, and instruct personnel as to the operational and maintenance features of the equipment.

5-7.17.5. Acceptance

5-7.17.5.1. Final acceptance of the facility will not be given until the Contractor has successfully completed all tests and after all defects in installation material or operation have been corrected.

5-8 Hawaiian Electric Company (HECO) Coordination

5-8.1 All coordination work with HECO shall be done through the Contracting Officer.

5-8.2 Provide the complete 46 KV ductline system as shown on plan. This ductline system will be used by HECO for their 46 KV circuits. HECO will provide and pull the cables; the contractor is required to coordinate with HECO for this work to be done.

5-8.3 All work for the 46 KV ductline, manholes, and Mamala substation transformer yard and metering shall be designed and constructed in accordance with Hawaiian Electric Company (HECO) standards and guidelines. Contact HECO to coordinate the design. The contact person at HECO is Tanay Panalal, 543-7708 or at tanay.panalal@heco.com.

5-8.4 Complete the design and obtain signatures on all the drawings and specifications pertaining to work relating to HECO.

5-8.5 Provide new Mamala substation including switchgear, building, HECO transformer yard wall and gate.

5-8.6 Refer to the plans for additional notes and requirements.

5-8.7 It is the contractor's responsibility to coordinate with the HECO inspector to periodically inspect the ductline installation. HECO will determine the frequency of the inspections. As a minimum, the inspector will need to visually inspect all ductlines before they are concrete jacketed and filled over. If the contractor fails to obtain inspections in the frequency as determined by HECO and HECO rejects any portion of the work, the contractor shall redo the work to HECO's and the Contracting Officer's satisfaction at no extra cost to the Government.

5-8.8 Provide the fluidized thermal backfill and thermal concrete per HECO specifications. Standard backfill materials and concrete shall NOT be substituted for these materials without the written consent from HECO and the Government. See attachments of this RFP.

5-8.9 HECO will design and construct all the infrastructure within the HECO transformer yard including all grading, pavements, pads, foundations, and grounding unless as noted on plan. The contractor is required to provide the surrounding wall and gate only. Coordinate the sequence of construction with HECO such that HECO is granted reasonable access and space to do their work. HECO will require that the wall and gate not be constructed until their grading, subgrade (grounding, foundations), and on grade (pads and pavement) work is completed.

5-8.10 Obtain from HECO their approval stamp and signatures on both the plans and specifications for the ductline and substation design prior to the start of construction. Any construction done without approved plans and specifications are subject to approval and acceptance from HECO. Any portions of work not acceptable to HECO shall be redone to HECO's standards at no additional cost to the government.

5-8.11 The standards provided in the plans and specifications are excerpts from the HECO standards book and is given only as a starting point for the design. Consult with HECO to obtain any additional standards required to complete the design and for construction.

5-9 Lighting Materials and Methods

5-9.1 Wiring methods shall be identical to that described in the electrical sections above. All switches and devices shall be commercial or specification grade and UL listed. Residential grade switches or devices are not acceptable.

5-9.2 Provide lighting levels and uniformity per the recommendations of the IES and the MILHDBK 1190. As a minimum, provide the following footcandle levels for the described conditions.

Space	Minimum Average Lux	Minimum Average Footcandles
Utility rooms	305	30
Exterior perimeter lighting and walkways	10	1
Exterior entryways	153	15
1. The lux (footcandle) levels shown are calculated to the normal working plane for the typical task in each room. Typical working plane is 762 (30 inches). Do not define any working planes higher than 914 (36 inches).		

5-9.3 Emergency Lighting

5-9.3.1. Emergency illumination systems shall be self contained battery powered packs with twin heads provided in accordance with the requirements of the NFPA 101. Provide at least one twin head emergency wall pack in back of each switchgear section and two in between the two switchgear sections.

5-9.3.2. All emergency lights and exit signs shall have integral battery packs providing a minimum of 1½ hours of run time during power outages. Fixtures shall have integral test switches and indicator lights.

5-9.4 Exterior Lighting

5-9.4.1. All exterior lighting shall be automatically controlled.

5-9.4.2. Provide exterior building perimeter lighting to maintain an even light level. Space lights strategically such that all perimeter doors have at least one fixture within 1 ½ meters. Perimeter lighting is limited to only the walls with lights as shown on the drawings.

5-9.4.3. All exterior fixtures shall be vandal resistant, UV stabilized, and shall have features and materials to minimize corrosion and impact damage. Color of finish shall be compatible with the color scheme of the building. All hardware shall be stainless steel.

5-9.4.4. All exterior light fixtures shall be the cut-off type and shall not create a glare hazard to the air field operations.

5-9.4.5. Provide exterior lighting around perimeter of HECO transformer yard per HECO standards. The lighting shall be served from the HECO Mamala Substation power.

5-9.5 Interior Lighting Control Schemes

5-9.5.1. Maintain minimum light levels for egress per NFPA 101 at all times.

5-9.6 Lamps

5-9.6.1. Utilize the most energy efficient lamp sources available for the fixtures used.

5-9.6.2. Standardize around F32T8 lamps with electronic ballasts for interior lighting and high-pressure sodium for exterior fixtures. Fluorescent lamps shall be EPA approved low mercury type.

5-9.6.3. Lamps shall have a minimum CRI of 82.

5-9.6.4. Minimize the number of different type lamps used for the building lighting systems.

5-9.6.5. Incandescent lamps shall not be used.

5-9.7 Fixtures

5-9.7.1. All lighting fixtures shall be UL Listed and be specification grade, Residential grade fixtures are not acceptable.

5-9.7.2. Interior lighting fixtures shall be ceiling surface or pendant mounted unless architectural and structural features of the building do not permit it.

5-9.7.3. Wall mounted fixtures shall comply with the Americans with Disabilities Act.

5-9.7.4. Strip lights shall have zinc coated wire guards.

5-10 Outside Plant Telephone

5-10.1 Coordinate all OSP design and construction details and supervision of construction work with the HAFB Cable-Antenna (CAT) team via the Contracting Officer. Coordinate with the Contracting Officer for the ordering of cables through the Base Planning and Implementation Flight (15CS/SCX).

5-10.2 Break into the telecommunications manhole under the supervision of the Base Planning and Implementation Flight (15CS/SCX). Provide empty conduit as shown on plan. The cable from the manhole to the building telephone cabinet will be by the Government. Coordinate the cable installation through the Contracting Officer. All splices in the manhole and terminations to the cabinet will be by the Government.

5-11 Inside Plant Telephone

Minimum Provisions – Provide enough service infrastructure including 110 blocks and cabinet to accommodate a single telephone in the substation building, and for HECO metering requirements. Coordinate the HECO requirements with HECO metering department.

5-11.1 Horizontal Distribution Pathways - Horizontal distribution pathways shall consist of concealed conduit.

5-11.2 Telephone – Provide a pre-wired telephone conduit system to the phone outlet shown on plan in accordance with EIA/TIA 568, 569, 606 and 607. The telephone raceway system will consist of 25 mm (1 inch) minimum electrical metallic tubing (EMT) conduit in CMU wall or schedule 40 PVC below grade. The raceway shall homerun to the telephone cabinet and be complete with wire, phone jack outlets, and backbox. Provide a new telephone cabinet in the substation of size shown on plan complete with treated plywood backboard, protected terminal strip and ground.

5-11.3 All new wiring shall be Category 6, #24 AWG UTP cable, compliant with TIA/EIA-568-B.

5-11.4 Provide telephone outlets consisting of two 8-pin modular (RJ-45 type) connectors in a single or double gang outlet faceplate with two each 4 pair Category 6 #24 AWG UTP cable terminated at each jack, and with homerun to the cabinet.

5-11.5 All receptacles shall utilize RJ-45 jacks.

5-11.6 Provide a duplex power receptacle at the telecommunications cabinet.

5-11.7 Terminations shall comply with ANSI/EIA/TIA 568B termination standards.

5-11.8 Installer Qualifications: Prior to installation, submit data of installer's experience and qualifications. Installers shall be a Building Industry Consulting Service International (BICSI) Registered Cabling Installation Technician or have experience, which shall include 3 years on projects of similar complexity. Include names and locations of two projects successfully completed using copper communications cabling systems. Include written certification from users that systems have performed satisfactorily for not less than 18 months. Include specific experience in installing and testing structured telecommunications distribution systems using Category 6 cabling systems.

5-11.9 Components: UL or third party certified. Provide a complete system of telecommunications cabling and pathway components complete with conduits, terminal boxes, outlets, cables, junction boxes, and telephone backboards. Fixed cables and pathway systems for telecommunications systems shall be UL listed or third party independent testing laboratory certified, and shall comply with NFPA 70.

5-11.10 Pathways (Backbone and Horizontal): EIA/TIA-569-A. Provide grounding and bonding as required by EIA/TIA-607.

5-11.11 Telecommunications Cabling: Cabling shall be UL listed for the application and shall comply with EIA TSB-67, EIA/TIA-568-B and NFPA 70. Provide a labeling system for cabling as required by EIA/TIA-606 and UL 969. Cabling manufactured more than 12 months prior to date of installation shall not be used.

5-11.12 Backbone Copper: ANSI/ICEA S-80-576, EIA/TIA-568-B and UL 444.

5-11.12.1. Horizontal Cabling: Comply with NFPA 70, NEMA WC 63.1, ANSI/ICEA S-80-576, EIA TSB-67 and performance characteristics in EIA/TIA-568-B.

5-11.12.2. Horizontal Copper: UTP (unshielded twisted pair), 100 ohm, Category 6 UTP, UL listed to comply with EIA/TIA-568-B Category 6 requirements.

5-11.13 Distribution Frames

5-11.13.1. Connector Blocks: 110 type for Category 6 and higher systems. Provide blocks for the number of horizontal and backbone cables terminated on the block plus 25 percent spare.

5-11.14 Outlet/Connector Copper: Outlet/connectors shall comply with FCC Part 68.5, and EIA/TIA-568-B. UTP Outlet/connectors shall be UL 1863 listed.

5-11.15 Outlets: Outlets shall consist of two voice, four spare jacks.

5-11.16 Cover Plates: Telecommunications cover plates shall match other outlet device covers and comply with UL 514C, and EIA/TIA-568-B.

5-11.17 Backboards: Provide void-free, fire rated interior grade plywood 21 (3/4 inch) thick as indicated. Backboards shall be painted with a gray, nonconductive fire-resistant overcoat. Do not cover the fire stamp on the backboard.

5-11.18 Grounding and Bonding

5-11.18.1. Comply with UL 467, EIA/TIA-607, and NFPA 70. Components shall be identified as required by EIA/TIA-606.

5-11.18.2. Provide a new #6 ground wire from the electrical service ground ring, and driven ground rods to the backboards. The ground wire shall be terminated in a copper ground bus bar. The bar shall be isolated from the wall, have a minimum of 6 lugs for #12 through #6 copper wire, and be centrally located on the backboard approximately 457 (18") above finished floor. Each ground bus bar shall have its own dedicated ground wire to the electrical service grounding electrode.

5-11.19 Installation

5-11.19.1. Telecommunications cabling and pathway systems, including the horizontal and backbone cable, pathway systems, telecommunications outlet/connector assemblies, and associated hardware shall be installed in accordance with EIA/TIA-568-B, EIA/TIA-569-A, NFPA 70, and UL standards as applicable. Metal raceway bases, covers, and dividers shall be bonded and grounded in accordance with EIA/TIA-607.

5-11.19.2. Cabling: Install Category 6 UTP telecommunications cabling and pathway system as detailed in EIA/TIA-568-B.

5-11.19.3. Pathway Installations: Comply with EIA/TIA-569-A.

5-11.19.4. Equipment Support Frames: Install in accordance with EIA/TIA-569-A

5-11.19.5. Grounding and Bonding: In accordance with EIA/TIA-607, and NFPA 70.

5-11.19.6. Test Plan: Provide a complete and detailed test plan for the telecommunications cabling system including a complete list of test equipment for the UTP components and accessories. Include procedures for certification, validation, and testing.

5-11.19.7. Category 6 Links. Perform UTP link tests in accordance with EIA/TIA-568-B.

5-11.20 Do not install more than two 1.57 rad (90 degree) conduit bends in any conduit runs unless specifically approved by the Contracting Officer. Use of conduit outlet bodies such as LBs are not allowed. All bends shall be sweeping bends. Minimum radius bends shall comply with TIA/EIA-569-A.

5-12 Power System Coordination Study

5-12.1 Analyses shall be prepared to demonstrate that the equipment selected and system constructed meet the contract requirements for ratings, coordination, and protection. They shall include a load flow analysis, a fault current analysis, and a protective device coordination study. The studies shall be performed by a registered professional engineer with demonstrated experience in power system coordination in the last 7 years. The Contractor shall provide a list of references complete with points of contact, addresses and telephone numbers. The selection of the engineer is subject to the approval of the Contracting Officer.

5-12.2 Scope of Analyses

5-12.2.1. The fault current analysis, and protective device coordination study shall begin at: the source bus and extend through outgoing breakers down to the individual protective devices for medium voltage radial taps including the largest transformer on the circuit.

5-12.2.2. The analysis shall include scenarios with one, two, and three buses (one future, assuming identical to MA and MB) operating in parallel from up to three separate but identical HECO 12.5 mVA transformers.

5-12.2.3. The short circuit levels for one transformer shall not exceed 100 MVA.

5-12.3 Determination of Facts

5-12.3.1. The time-current characteristics, features, and nameplate data for each existing protective device shall be determined and documented. The Contractor shall coordinate with Hawaiian Electric Company for the 46 KV fault levels and transformer information.

5-12.4 Single Line Diagram

5-12.4.1. A single line diagram shall be prepared to show the electrical system buses, devices, transformation points, and all sources of fault current (including generator and motor contributions). A fault-impedance diagram or a computer analysis diagram may be provided. Each bus, device or transformation point shall have a unique identifier. If a fault-impedance diagram is provided, impedance data shall be shown. Location of switches, breakers, and circuit interrupting devices shall be shown on the diagram together with available fault data, and the device interrupting rating.

5-12.5 Fault Current Analysis

5-12.5.1. Method

5-12.5.1.1. The fault current analysis shall be performed in accordance with methods described in IEEE Std 242, and IEEE Std 399.

5-12.5.2. Data

5-12.5.2.1. Actual data shall be utilized in fault calculations. Bus characteristics and transformer impedance shall be those proposed. Data shall be documented in the report.

5-12.5.3. Fault Current Availability

5-12.5.3.1. Balanced three-phase fault, bolted line-to-line fault, and line-to-ground fault current values shall be provided at each voltage transformation point and at each power distribution bus. The maximum and minimum values of fault available at each location shall be shown in tabular form on the diagram or in the report.

5-12.5.4. Coordination Study

5-12.5.4.1. The study shall demonstrate that the maximum possible degree of selectivity has been obtained between devices specified, consistent with protection of equipment and conductors from damage from overloads and fault conditions. The study shall include a description of the coordination of the protective devices in this project. A written narrative shall be provided describing: which devices may operate in the event of a fault at each bus; the logic used to arrive at device ratings and settings; situations where system coordination is not achievable due to device limitations (an analysis of any device curves which overlap); coordination between upstream and downstream devices; and relay settings. Recommendations to improve or enhance system reliability, and detail where such changes would involve additions or modifications to the contract and cost damages (addition or reduction) shall be provided. Composite coordination plots shall be provided on log-log graph paper.

5-12.5.4.2. Miscellaneous Protective Relay Study

a) Provide setting calculations and description for all relays and current transformers used including differential relays, directional power flow relays, overcurrent, and ground fault relays.

5-12.5.5. Study report

5-12.5.5.1. The report shall include a narrative describing: the analyses performed; the bases and methods used; and the desired method of coordinated protection of the power system.

5-12.5.5.2. The study shall include descriptive and technical data for existing devices and new protective devices proposed. The data shall include manufacturers published data, nameplate data, and definition of the fixed or adjustable features of the existing or new protective devices.

5-12.5.5.3. The report shall document utility company data including system voltages, fault MVA, system X/R ratio, time-current characteristic curves, current transformer ratios, and relay device numbers and settings; and existing power system data including time-current characteristic curves and protective device ratings and settings.

5-12.5.5.4. The report shall contain fully coordinated composite time-current characteristics curves for each bus in the system, as required to ensure coordinated power system protection between protective devices or equipment. The report shall include recommended ratings and settings of all protective devices in tabulated form.

5-12.5.5.5. The report shall provide the calculation performed for the analyses, including computer analysis programs utilized. The name of the software package, developer, and version number shall be provided. The base software analysis package is EDSA EE Plant by EDSA Micro Corporation, San Diego California. It is not specifically required that the analysis be provided in EDSA provided that all the data used in the model is furnished to the Government as a part of the report.

CHAPTER 6

ENVIRONMENTAL AND WORKER PROTECTION

6-1 Asbestos Abatement - General Requirements: The general scope of asbestos abatement work for this project consists of safe abatement by complete removal, of asbestos-containing materials (ACM) which will be disturbed during this project. Contractor shall provide specifications addressing appropriate public health, worker and environmental protection, and measures including personal protective equipment (PPE), wet methods and engineering controls, and execute same to conduct the abatement work safely and effectively. Monitoring to assess airborne asbestos fiber concentrations in the vicinity of worker breathing air shall be performed as required by OSHA. Air monitoring shall also be conducted at the upwind and downwind boundaries of all work areas. ACM shall not be abated unless it is likely to be disturbed by the work of this project.

6-2 Coordination with Other Projects: This project is only one of multiple projects being constructed in the same general area. Coordination is required between these different projects in order to ensure a smooth transition and working conditions. Provide continual coordination with the other projects via the Contracting Officer from the NTP to the final acceptance of this project. The contractor performing abatement of ACM is responsible to coordinate his work with the General Contractor. Conduct meetings as required to provide this coordination or as directed by the Contracting Officer.

6-3 Coordination with Government Agencies: All work shall be coordinated with the appropriate Government agency through the Contracting Officer and shall be documented in writing in accordance with other parts of this specification. The work shall include the requirements of these agencies, including but are not limited to the following:

6-3.1 U.S. Environmental Protection Agency

6-3.2 U.S. Occupational Safety and Health Administration

6-3.3 State of Hawaii Department of Health, Environmental Management Division

6-3.4 State of Hawaii Department of Labor and Industrial Relations, Occupational Safety and Health Division.

6-4 Specifications: Use the latest applicable technical sections of the Unified Facilities Guide Specifications (UFGS) in the preparation of the final design except as specifically detailed herein.

6-5 Specifier Qualifications: For the design of disturbances of ACM, provide the services of an Asbestos Project Designer currently registered in the State of Hawaii.

6-6 Contractor Qualifications: Work under this section shall be performed, and equipment shall be furnished and installed, by a qualified Contractor as defined herein. The contractor shall have a minimum of five years of experience with abatement of friable ACM and shall hold a current C-19 license in the State of Hawaii.

6-7 Regulatory Compliance: Specifications, designs and execution of the work shall comply with the latest revisions and amendments of the codes and regulations listed below.

6-7.1 29 CFR 1926.134 Respiratory Protection

6-7.2 29 CFR 1926.51 Sanitation

6-7.3 29 CFR 1926.59 Hazard Communication

6-7.4 29 CFR 1926.1101 Asbestos, Tremolite, Anthophyllite, Actinolite

6-7.5 40 CFR 61 Subpart A General Provisions

6-7.6 40 CFR 61 Subpart M National Emission Standard for Asbestos

6-7.7 40 CFR 763 Asbestos Containing Materials in Schools

6-7.8 EPA 560/5-85-024 Guidance for Containing Materials in Buildings

6-7.9 ND OPNAVINST 5100.23 (Rev. D) Navy Occupational Safety and Health (NAVOSH) Program Manual

6-7.10 UL 586 (1999; Rev. through Aug. 1999) High Efficiency Particulate, Air Filter Units

6-7.11 ANSI Z9.2 (1979, R 1991) Fundamentals Governing the Design and Operation of Local Exhaust Systems

6-7.12 ANSI Z88.2 (1992) Respiratory Protection

6-7.13 State Of Hawaii, Department of Health, Hawaii Administrative Rules, Title 11, Chapters 501 through 504

6-8 Asbestos Abatement - Preconstruction Submittals: Government approval will be required for all submittals. The following shall be submitted and approved prior to initiation of construction:

6-8.1 SD-02 Asbestos Hazard Abatement Plan - a site-specific description of the means and methods which are anticipated to be used to abate identified ACM. The plan shall include:

6-8.2 SD-02 Equipping workers with proper protective clothing and respiratory protection prior to entering the work space from the outside.

6-8.3 SD-02 Safe work practices in the work place; exclusion of eating, drinking, smoking; prohibition of procedures or equipment that would in any way reduce the effectiveness of respiratory protection or other engineering controls.

6-8.4 SD-02 Enforcement of proper exit practices procedures from the work space.

6-8.5 SD-02 A description of the means and methods proposed to be used to performing ACBM disturbance and subsequent encapsulation, in ways that minimize the potential for fiber release.

6-8.6 SD-02 Packing, labeling, loading, transporting, and disposing of contaminated material in a way that minimizes or prevents exposure and contamination.

6-8.7 SD-02 Emergency evacuation of personnel, for medical or safety (fire and smoke) so that exposure will be minimized.

6-8.8 SD-02 Safety from accidents in the work space, especially from electrical shocks, slippery surfaces, and entanglements in loose hoses and/or equipment.

6-8.9 SD-02 Provisions for effective supervision, and OSHA-specified personnel air monitoring during the work.

6-8.10 SD-02 Engineering systems that will minimize exposure to fibers in the work space, including the exact locations, numbers, sizes and types of HEPA-filtered exhaust units, location of exhausts; and the method of discharge to the building exterior.

6-8.11 SD-02 Hazard Communication Plan: a description of the contractor=s program to comply with 29 CFR 1926.59, and copies of all Material Safety Date Sheets (MSDS) for all materials brought to the site.

6-8.12 SD-02 Respiratory Protection Plan as required by ANSI Z88.2, 29 CFR 1926.1101 and 29 CFR 1926.103.

6-8.13 SD-02 Notification of Demolition and Removal shall be prepared, submitted to the EPA and Hawaii State Department of Health and paid for by the Contractor.

6-8.14 SD-03 Product data for: Local exhaust equipment, HEPA-filtered vacuums, Respirators and filters, Amended water, Encapsulant.

6-8.15 SD-06 Test Reports for: Personal Air Monitoring Results, Area Air Monitoring Results, Asbestos Disposal Quantity Report, Clearance Sampling Results.

6-8.16 SD-07 Certificates for: Training certificates for workers and supervisors, Inspector training certificate for air monitoring personnel, Project designer certificate for specification writer, Testing laboratory certification, Medical clearance certification for respirator use.

6-9 Asbestos Abatement - Prior Surveys: An investigative survey of the areas in which work will be performed has been made and a survey report prepared which is entitled "Investigative Asbestos-Containing Material (ACM) and Lead-Containing Paint (LCP) Survey for: Phase 1 Upgrade Electrical Distribution System at Hickam Air Force Base" (Edward K. Noda and Associates, Inc., dated January 2004). Contractor shall obtain a copy of this report and become familiar with the types and occurrences of ACM described therein.

6-9.1 It is also believed that asbestos-containing transite electrical duct occurs under the existing slab at the substation site.

6-9.2 Where materials similar in color and texture to those identified as ACM occur, they shall be presumed to be ACM and shall be treated as if they are in fact ACM, unless tested and proven otherwise.

6-10 Asbestos Abatement - Execution: Existing ACM which will be disturbed by the work of this project shall be abated (completely removed, the substrate cleaned and encapsulated) prior to the disturbance, using appropriate required public health, worker and environmental protection measures, including worker PPE, respiratory protection, and the use of wet methods, engineering controls, and in accordance with applicable State and Federal laws and regulations, the specifications and approved contractor submittals.

6-10.1 ACM may occur on live electrical equipment. Contractor shall ensure that all equipment is de-energized and locked out prior to disturbance of ACM.

6-10.2 Underground electrical structures in which ACM must be abated may have become flooded with water. Contractor shall coordinate to safely dewater these structures prior to entry. Dewater fluids shall be filtered through a 5 micron filter system and filtered water discharged to the area sanitary sewer system. Filtrate and used filters shall be collected, packaged and disposed of as asbestos-contaminated waste.

6-11 Clearance of Asbestos Abatement Work Areas: Work areas from which ACM has been abated shall be thoroughly wet cleaned and HEPA vacuumed, then visually inspected as directed by the Project Manager. Air in work areas from which ACM has been abated shall be sampled and analyzed using phase contrast microscopy (PCM) in accordance with aggressive air sampling techniques defined in EPA 560/5/85/024. Enclosures and critical barriers a work area shall only be dismantled after clearance air sampling analysis results of three samples from the work area are less than 0.01 fibers/cc or background, whichever is greater. If clearance air sample analyses exceed

0.01 fibers/cc or background, contractor shall repeat the cleaning and sampling, at his own expense, until the airborne fiber concentration is less than 0.01 fibers/cc.

6-12 Disturbance of Lead-Containing Paint and Electrical Cables - General Requirements: The general scope of lead-containing paint (LCP) disturbance work for this project consists of worker and environmental protection during demolition of existing concrete structures with LCP, and demolition (cutting and removal) of electrical cables covered or sheathed with lead. Contractor shall provide specifications addressing appropriate public health, worker and environmental protection, and measures including PPE, wet methods and engineering controls, and execute same to conduct the disturbance work safely and effectively. Monitoring to assess airborne lead concentrations in the vicinity of worker breathing air shall be performed as required by OSHA. Air monitoring shall also be conducted at the upwind and downwind boundaries of all work areas. LCP shall not be disturbed unless required by the work of this project.

6-13 Coordination with Government Agencies: All work shall be coordinated with the appropriate Government agency through the Contracting Officer and shall be documented in writing in accordance with other parts of this specification. The work shall include the requirements of these agencies, including but are not limited to the following:

6-13.1 U.S. Environmental Protection Agency

6-13.2 U.S. Occupational Safety and Health Administration

6-13.3 State of Hawaii Department of Health, Environmental Management Division

6-13.4 State of Hawaii Department of Labor and Industrial Relations, Occupational Safety and Health Division.

6-14 Specifications: Use the latest applicable technical sections of the Unified Facilities Guide Specifications (UFGS) in the preparation of the final design except as specifically detailed herein. For the design of disturbances of LCP, provide the services of an Lead Project Designer currently registered with the Environmental Protection Agency.

6-15 Contractor Qualifications: Work under this section shall be performed, and equipment shall be furnished and installed, by a qualified Contractor as defined herein. The contractor shall have a minimum of five years of experience with disturbance of LCP.

6-16 Regulatory Compliance: Specifications, designs and execution of the work shall comply with the latest revisions and amendments of the codes and regulations listed below.

6-16.1 29 CFR 1910.1025 Lead

6-16.2 29 CFR 1926.21 Safety Training and Education

6-16.3 29 CFR 1926.55 Gases, Vapors Fumes, Dusts, and Mists

6-16.4 29 CFR 1926.59 Hazard Communication

6-16.5 29 CFR 1926.62 Lead

6-16.6 29 CFR 1926.103 Respiratory Protection

6-16.7 29 CFR 1926.65 Hazardous Waste Operations and Emergency Response

6-16.8 40 CFR 260 Hazardous Waste Management System: General

6-16.9 40 CFR 261 Identification and Listing of Hazardous Waste

6-16.10 40 CFR 262 Generators of Hazardous Waste

6-16.11 40 CFR 263 Transporters of Hazardous Waste

6-16.12 40 CFR 264 Standards for Owners and Operators of Hazardous Waste Treatment, Storage and Disposal Facilities

6-16.13 40 CFR 268 Hazardous Materials Table, Special Provisions, Hazardous Materials Communications, Emergency Response Information, and Training Requirements

6-16.14 49 CFR 178 Specifications for Packaging

6-16.15 OPNAVINST 5100.23 (Rev. D) Navy Occupational Safety and Health (NAVOSH) Program Manual

6-16.16 UL 586 (1999; Rev. through Aug. 1999) High Efficiency Particulate, Air Filter Units

6-16.17 ANSI Z88.2 (1992) Respiratory Protection

6-17 Disturbance of Lead-Containing Paint - Submittals: Government approval is required for all submittals. The following shall be submitted in accordance with this and other sections of this specification and approved prior to initiation of construction:

6-17.1 SD-02 LCP Compliance Plan - a site-specific description of the means and methods which are anticipated to be used during disturbance of identified LCP. The plan shall include:

6-17.1.1. Equipping workers with proper protective clothing and respiratory protection prior to entering the work space from the outside.

6-17.1.2. Safe work practices in the work place; exclusion of eating, drinking, smoking; prohibition of procedures or equipment that would in any way reduce the effectiveness of respiratory protection or other engineering controls.

6-17.1.3. Enforcement of proper exit practices procedures from the work space.

6-17.1.4. A description of the means and methods proposed to be used during disturbance of LCP in ways that minimize the potential for generation of airborne lead-containing dust.

6-17.1.5. Packing, labeling, loading, transporting, and disposing of contaminated material in a way that minimizes or prevents exposure and contamination.

6-17.1.6. Emergency evacuation of personnel, for medical or safety (fire and smoke) so that exposure will be minimized.

6-17.1.7. Safety from accidents in the work space, especially from electrical shocks, slippery surfaces, and entanglements in loose hoses and/or equipment.

6-17.1.8. Provisions for effective supervision, and OSHA-specified personnel air monitoring during the work.

6-17.1.9. Engineering systems that will minimize exposure to lead dust in the work space, including generation, control, collection, handling and disposal of debris, and testing to assess whether the wastes are hazardous.

6-17.1.10. Competent Person Qualifications and certification.

6-17.1.11. Training certificates for workers and supervisors

6-17.1.12. Lead waste management plan.

6-17.1.13. Certification of medical exams

6-17.2 SD-05 TEST REPORTS: Occupational and Environmental Assessment Data Report

6-17.3 SD-07 CERTIFICATIONS: Testing Laboratory qualifications

6-17.4 SD-11 CLOSEOUT SUBMITTALS: Completed and signed hazardous waste manifest from the treatment and disposal facility (if used) and waste shipment records.

6-18 Prior Surveys: An investigative survey of the areas in which work will be performed has been made and a survey report prepared, entitled "Investigative Asbestos-Containing Material (ACM) and Lead-Containing Paint (LCP) Survey for: Phase 1 Upgrade Electrical Distribution System at Hickam Air Force Base" (Edward K.

Noda and Associates, Inc., dated January 2004). Contractor shall obtain a copy of this report and become familiar with the types and occurrences of LCP described therein.

6-18.1 Where surface coatings similar in color to those identified as LCP occur, they shall be presumed to be LCP and shall be treated as if they are in fact LCP, unless tested and proven otherwise.

6-18.2 Electrical cables sheathed or covered with lead may also exist in underground ducts.

6-19 Disturbance of Lead-Containing Paint - Execution: Workers whose tasks require disturbance of LCP shall use appropriate required public health, worker and environmental protection measures, including worker PPE, respiratory protection, and the use of wet methods, engineering controls, and in accordance with applicable State and Federal laws and regulations, the specifications and approved contractor submittals. LCP shall not be disturbed unless it is required to do so.

6-19.1 Demolition debris shall be sampled and tested via the Toxicity Characteristic Leaching Procedure to determine whether it constitutes hazardous waste with respect to leachable lead.

6-19.2 Lead-containing cables shall be cut with bolt cutters or similar tools in a manner that does not produce lead dust or chips. Lead sheathing may be recycled by the contractor.

6-20 Soils Investigation: Sampling and analyses of subsurface soil materials from the Back Station site and along the duct line route were conducted. The investigation and findings are summarized in a report entitled "Limited Subsurface Investigation, Upgrade Electrical System, Phase 1, Hickam Air Force Base, Oahu, Hawaii", by Edward K. Noda and Associates, Inc. and dated January 28, 2004. The contractor shall obtain a copy of this report and become familiar with the scope and results of the subsurface investigation.

Samples of soils were obtained from ten shallow borings along the duct alignment and at the Back Station site. Soil samples were analyzed for the following parameters: Total Petroleum Hydrocarbons as Gasoline, Diesel, Motor Oil and Jet Fuel; Benzene, Toluene, Ethylbenzene and Xylenes; Volatile Organic Compounds; Polynuclear Aromatic Hydrocarbons Benzo(a)yrene, Acenapthene, Napthalene and Fluoranthene; Total Arsenic, Cadmium, Chromium and Lead; eight RCRA metals; and polychlorinated biphenyls. Detectable concentrations of several analytes were found. None of the detected analytes occurred in concentrations exceeding the State of Hawaii Tier 1 Action Levels for Soils and Groundwater, or exceeding the EPA Preliminary Remediation Goals for industrial sites.

Presence of soil and/or groundwater contaminants in concentrations above the Department of Health “Allowable Levels for Soil and Groundwater” was not confirmed during the investigation conducted for this project. However, several other projects have been or are being conducted by the Air Force in the immediate vicinity of this project, which have encountered contaminated soils and/or groundwater, particularly in the vicinity of Building 1055, where chlorinated solvents are present in groundwater. The contractor shall anticipate encountering volatile organic compounds, polynuclear aromatic hydrocarbons, jet fuel, motor gasoline, motor oil, and similar compounds where his excavations penetrate groundwater.

6-21 Other Investigations: Sampling and analyses for sites along the alignment of this project have been collected and summary reports published. In particular, the contractor shall obtain and review a copy of the "Final Site Inspection Report, Hickam Air Force Base, Oahu, Hawaii" Volumes 1 and 2, dated October 29, 1999, prior to preparation of his Dewatering Plan. The documents, and other reports addressing soil and groundwater contamination in the vicinity, are also available on the internet at http://www.adminrec.com/PACAF.asp?Location=Hawaii. Click on Hickam and then "expert search", and enter "B308" in the "AR IR File Number" field to retrieve Volume 1 as an Adobe Acrobat file, and "B512" to retrieve Volume 2. Another report entitled "Final Comprehensive Verification Report, Underground Storage Tank Interim Remedial Action" and dated May 30, 2003, is available for viewing at the 15 CES/CEVR office.

6-22 Discovery of Contaminated Soils and Groundwater: The contractor shall be prepared to encounter, handle and dispose of petroleum- and solvent-contaminated soils and to encounter and cut abandoned petroleum transmission lines which have been flushed and capped. Remnant amounts of flush water and petroleum product may be present in the lines. Contractor shall prepare and submit a detailed plan describing his process for addressing such materials. At a minimum, the plan shall address the contractor's planned methods to:

Identify the contamination

Notification procedures for the 15 CES/CEVR and the Department of Health, Hazard Evaluation and Emergency Response Branch.

Treatment and disposal options appropriate to the contamination found.

Procedures to cut and cap abandoned petroleum product lines which have been flushed with water and to collect, manage and dispose of remnant quantities of flush water contaminated with petroleum product.

The plan shall be submitted and approved 30 days prior to excavation work which may encounter contaminated soils.

6-23 Excavation, Handling and Disposal of Contaminated Soils: Contractor shall anticipate the presence of contaminated soils and groundwater and conduct his operations in accordance with applicable portions of the most current draft of the State of Hawaii, Department of Health "Technical Guidance Manual for the Implementation of the Hawaii State Contingency Plan", Section 01430 and the procedures presented in the NOI Form G and Notice of General Permit Coverage and Standard General Conditions.

In the event that evidence of contamination is found by the contractor, immediately report the evidence of contamination to the Contracting Officer.

Contaminated soils which are to be reused as backfill shall be stockpiled in area secured by chain link fencing from public access, on a layer of 6-mil polyethylene sheeting so that they do no leach or release contaminants into uncontaminated soils, and shall be covered at all times with a layer of 6-mil thickness sheeting to prevent contamination of surrounding areas via surface runoff. Plastic sheeting shall be placed without open joints; all seams shall be lapped and made water-tight with spray glue. A berm at least 12 inches tall shall surround all stockpiles of contaminated soil. Alternatively, contaminated soils may be stored in a lined and covered rolloff container. Excavated soils shall not be used as fill material in residential areas.

Contaminated soils which are not planned to be used as backfill shall be disposed offsite and records of the amount of disposal provided to the Contracting Officer.

6-24 Dewatering and Disposal of Contaminated Groundwater: Contractor shall anticipate conducting dewatering, including removal, treatment and disposal of contaminated groundwater, below approximately 2.5 feet MSL, and shall prepare and submit a Dewatering Plan, containing a job-specific description of the contractor's proposed methods to conduct dewatering, including removal, treatment and disposal of waters contaminated with volatile organic compounds, polynuclear aromatic hydrocarbons, jet fuel, kerosene, gasoline, and chlorinated solvents. At a minimum, the plan shall address the contractor's planned methods to:

Identify the contamination.

Notify 15 CES/CEVR and the Department of Health, Hazard Evaluation and Emergency Response Branch.

Conduct all dewatering and dewater return in a manner which prevents vertical and lateral migration of contaminated groundwater to or from areas outside of the limits of his work, including means to prevent migration through excavation side walls or the trench invert. Dewater fluids should be returned to the back trench as close as practicable to the point of withdrawal, at a rate close to the withdrawal rate. Contaminated dewater fluids shall be returned to the same contaminated groundwater plume.

Treat and dispose of contaminated dewater fluids in a manner appropriate to the contamination found.

Disposal of groundwater to the storm drainage system will not be permitted.

Where a visible sheen or free product layer is encountered, the contractor will immediately notify Bernie Marcos at phone 449-5723, William Grannis at Hickam AFB Environmental Flight, telephone 449-1584 ext. 111, and the Department of Health (DOH) HEER office at 586-4249. A DOH-HEER representative shall observe sheen or free product removal activities. A minimum of 48 hours shall be allowed for the DOH-HEER representative to respond. Sheen or free product shall be removed by appropriate methods determined by the nature of the contamination. Recovered product shall be properly containerized and removed for off-base disposal or recycling in accordance with applicable regulations. The Contractor's approved Health and Safety Plan shall be followed at all times when working in areas with contaminated soil and/or groundwater.

6-25 **Worker Protective Equipment:** Class "D" PPE (steel toed work boots, hard hat, gloves or goggles if deemed necessary by the Contractor) shall be provided for all employees whose work tasks may place them in direct contact with excavated soils. Smoking shall not be permitted within excavations or in the vicinity of excavations in which petroleum odor is evident. Workers shall be provided with hand wash facilities and shall wash their hands and faces prior to lunch and at the end of the work day before leaving the site. Prior to exiting the work area for lunch or at the end of a work shift, workers shall remove discard disposable PPE. Contaminated equipment shall not be taken from the work area or taken home.

ATTACHMENT #1

DD 1391 KNMD 01-3002A1 UPGRADE ELECTRICAL DISTRIBUTION SYSTEM, PHASE 1, HAFB

1. COMPONENT AIR FORCE	FY 2004 MILITARY CONSTRUCTION PROJECT DATA (computer generated)	2. DATE

3. INSTALLATION AND LOCATION	4. PROJECT TITLE
HICKAM AIR FORCE BASE, HAWAII	UPGRADE ELECTRICAL DISTRIBUTION SYSTEM, PHASE I

5. PROGRAM ELEMENT	6. CATEGORY CODE	7. PROJECT NUMBER	8. PROJECT COST ($000)
27596	812-225	KNMD013002A1	6,800

9. COST ESTIMATES

ITEM	U/M	QUANTITY	UNIT	COST
UPGRADE ELECTRICAL DISTRIBUTION SYSTEM, PH I	LS			5,428
SWITCHING STATION	LS			(2,100)
PRIMARY 11.5KV DISTRIBUTION/TIE LINE UG	LS			(3,328)
SUPPORTING FACILITIES				685
SOIL REMEDIATION	LS			(375)
ARCHAEOLOGICAL MONITORING	LS			(150)
PCB HANDLING AND DISPOSAL	LS			(10)
ASBESTOS/LEAD BASE PAINT/HANDLING/DISPOSAL	LS			(150)
SUBTOTAL				6,113
CONTINGENCY (5.0 %)				306
TOTAL CONTRACT COST				6,419
SUPERVISION, INSPECTION AND OVERHEAD (6.5 %)				417
TOTAL REQUEST				6,836
TOTAL REQUEST (ROUNDED)				6,800

10. Description of Proposed Construction: Excavation, trenching, backfill, dewatering, saw cutting, asphalt patching, concrete encased ducts, conductors, ground wire, hand-holes, man-holes, removal, disposal, switchgears, switching station, fire proofing, soil remediation, PCB disposal, asbestos/lead based paint disposal, archaeological monitoring, and appurtenances.

11. REQUIREMENT: LS ADEQUATE: LS SUBSTANDARD: LS

PROJECT: Upgrade base electrical distribution system. (Current Mission/C-17 Support).

REQUIREMENT: A safe and reliable electrical distribution system with adequate commercial backup power is needed to support all base missions. This project will eliminate existing electrical distribution system vulnerability; provide backup electrical service from source; extend usable life of distribution system capacity; enhance flexibility for reliable power supply; and correct unsafe working conditions.

CURRENT SITUATION: The electrical distribution system was installed in the late 1930s/early 1940s and much of the original equipment is still in use. The system is beyond its design life and at its design capacity. There is insufficient backup power to service mission essential facilities when the primary power service is disrupted. The system's vulnerability is evidenced by an increasing number of outages due to its age. In 2000, the system had 22 unscheduled outages and each year the number of outages continues to increase. This increase in annual outages is directly attributable to the deteriorated condition of the electrical distribution system and points towards increasingly unreliable service. Outages last a significant time and affect large areas because most of the equipment was originally installed in the 1930s/1940s, is dangerous to work on, and the system lacks modern day loops to backfeed areas affected by outage. The aged electric back station has only one spare high voltage breaker and all of the installed breakers are Westinghouse Type DH which are over 50 years old and no longer

1. COMPONENT AIR FORCE	FY 2004 MILITARY CONSTRUCTION PROJECT DATA (computer generated)		2. DATE
3. INSTALLATION AND LOCATION HICKAM AIR FORCE BASE, HAWAII		4. PROJECT TITLE UPGRADE ELECTRICAL DISTRIBUTION SYSTEM, PHASE I	
5. PROGRAM ELEMENT 27596	6. CATEGORY CODE 812-225	7. PROJECT NUMBER KNMD013002A1	8. PROJECT COST ($000) 6,800

manufactured. Major repairs have to be performed at a CONUS depot, and parts for some repairs must be custom manufactured. There are 102 "live front" transmission equipment sites located throughout the Hickam AFB distribution system. The majority of these

exposed 11,000-volt equipment, creating a life-threatening work environment.

IMPACT IF NOT PROVIDED: Base will not have sufficient emergency backup commercial power; the system will continue to fail more frequently. HQ Pacific Air Forces, 15th Air Base Wing, Joint Pacific Air Operations Center, Hawaii Air National Guard, and AMC strategic airlift missions and C-17 beddown will remain at unacceptable risk of power failure at this main southern enroute airbridge base.

ADDITIONAL: This is Phase 1 of a five-phased electrical distribution program to be accomplished in consecutive years at a total cost of $45 million. This project meets the criteria/scope specified in Air Force Handbook 32-1084, "Facility Requirements." A preliminary analysis of reasonable options for satisfying this requirement indicates that only one option will meet mission needs. Therefore, a complete economic analysis was not performed. A certificate of exception has been prepared. BASE CIVIL ENGINEER: Colonel Steven E. Hoarn, (808) 449-1660.

JOINT USE CERTIFICATION: This is an installation utility/infrastructure project and does not qualify for joint use at this location. However, all tenants on this installation are benefited by this project.

1. COMPONENT AIR FORCE	FY 2004 MILITARY CONSTRUCTION PROJECT DATA (computer generated)			2. DATE
3. INSTALLATION AND LOCATION HICKAM AIR FORCE BASE, HAWAII		4. PROJECT TITLE UPGRADE ELECTRICAL DISTRIBUTION SYSTEM, PHASE I		
5. PROGRAM ELEMENT 27596	6. CATEGORY CODE 812-225	7. PROJECT NUMBER KNMD013002A1	8. PROJECT COST ($000) 6,800	

12. SUPPLEMENTAL DATA:

a. Estimated Design Data:

(1) Status:
- (a) Date Design Started
- (b) Parametric Cost Estimates used to develop costs — YES
- * (c) Percent Complete as of 01 JAN 2003
- * (d) Date 35% Designed
- (e) Date Design Complete
- (f) Energy Study/Life-Cycle analysis was/will be performed — NO

(2) Basis:
- (a) Standard or Definitive Design - — NO
- (b) Where Design Was Most Recently Used -

(3) Total Cost (c) = (a) + (b) or (d) + (e):

	($000)
(a) Production of Plans and Specifications	0
(b) All Other Design Costs	0
(c) Total	0
(d) Contract	0
(e) In-house	0

(4) Construction Contract Award

(5) Construction Start

(6) Construction Completion

* Indicates completion of Project Definition with Parametric Cost Estimate which is comparable to traditional 35% design to ensure valid scope, cost and executability.

b. Equipment associated with this project provided from other appropriations:
N/A

ATTACHMENT #2

ELECTRICAL BASE STANDARDS

HICKAM AIR FORCE BASE POWER SYSTEM ANALYSIS
for
KNDM 01-3001 UPGRADE ELECTRICAL DISTRIBUTION SYSTEM
HICKAM AFB

PRIMARY POWER DISTRIBUTION CONCEPTS AND STANDARDS FOR UPGRADES AND ADDITIONS:

1. PROPOSED DISTRIBUTION SYSTEM SCHEMES

It is proposed that the upgrades, future additions and extensions to the primary distribution system follow standard design concepts that are consistent with utility company practices, and that equipment and material be standardized to simplify operation, maintenance, and repair of the electrical systems.

1.A. Primary power will be distributed using a 4-wire, 11.5Y/6.64 kV solidly grounded distribution system.

1.B. Three phase loads in areas with underground distribution will be served by dual radial feeders.

1.C. Single phase loads in areas with underground distribution will be served using a loop feed scheme with transformers connected line to neutral.

1.D Industrial and office loads will typically be segregated from residential loads by using feeders dedicated to each load type.

1.E. Industrial and office areas with underground distribution will be served by at least two primary circuits. These circuits will be tapped to serve transformers so that each transformer can be served from either of the two circuits.

1.F. Residential areas other than multi-story residential facilities will be served by single phase transformers. Primary underground distribution in these areas will utilize a loop system.

2. PROPOSED ELECTRICAL EQUIPMENT AND MATERIAL

It is proposed that equipment and material be standardized to simplify operation, maintenance, and repair of the electrical systems.

2.A. Primary cables – MV90, EPR insulated, polyethylene jacketed, semi-conducting strand screen, semi-conducting insulation screen 15 kV, 133% rating, copper conductors with filled strand, concentric neutral.

2.A.1. 3 - 1c500 kCM, with 1/3 neutral.

2.A.2. 3-1c#2/0, with 1/3 neutral.

2.A.3. 1c #2 with full concentric neutral for single phase loops.

2.B. Primary overhead conductors – bare copper, medium hard drawn

2.B.1. #4/0 – main feeders

2.B.2. #2 – taps and branches

2.C. Switches

2.C.1. Pad mounted switches – dead front air switches with stainless steel housings.

2.C.2. Fused cutouts-100A or 200A porcelain type as required for the application

2.C.3. Hook stick operated switches-400A or 600A as required for application

2.C.4. Pole mounted air switches – 400 or 600A load break type

2.D. Transformers shall be mineral oil insulated

2.D.1. Pad mounted single phase transformers – Dead front primary with load break loop feed switching.

2.D.2. Pad mounted three phase transformers – Dead front primary with load break switching for dual radial feed

2.D.3. Pole mounted transformers – 12 kV with four 2.5% full capacity taps below rated primary voltage or 7200/12470Y with four 2.5% full capacity taps below rated primary voltage

2.D.4. Three phase transformer voltage rating and taps: 12 kV with four 2.5% full capacity taps below rated primary voltage

2.D.5. Single phase transformer voltage ratings and taps: 12 kV with four 2.5% full capacity taps below rated primary voltage; or 7200/12470Y with four 2.5% full capacity taps below rated primary voltage

2.D.6. Pad mounted : Provide standard ANSI fittings including oil level. Provide stainless steel tanks, cabinets, and sill

2.D.7. Pole mounted: Provide stainless steel tanks and covers. External tap changer.

2.D.8. 1500 kVA and larger: Provide fuses or circuit breaker protection for coordination with upstream devices; provide differential protective relays.

2.E. Switchgear

2.E.1. Breaker Control Voltages

2.E.1.1. Switching Station: 125 VDC

2.E.1.2. End-of-Line Station: 48 VDC

2.E.1.3. Voltage Type

2.E.1.3.1. Primary Breaker: DC trip and close

2.E.1.3.2. Secondary Main Breaker: DC trip and close

2.E.1.3.3. Secondary Feeder Breaker: DC trip and close

2.E.2. Breaker Indication Lights

2.E.2.1. Provide indication lights (transformer, resistor or diode type) on each feeder breaker panel to indicate whether breaker is open or closed.

2.E.3. Lightning Arrestors

2.E.3.1. Lightning arrestors required in primary switchgear if any portion of incoming primary circuits is routed overhead.

2.E.4. Primary bus shall be copper, fully insulated.

2.E.5. Insulators

2.E.5.1 All switchgear insulators shall be made of porcelain due to the proximity of a marine environment.

2.E.6. Provide bus bar connection from primary switchgear bus to any required potential transformers instead of cable connection due to higher probability of failure for cable connections.

2.E.7. Provide three-phase live front temporary grounding set(s) (combination of required clamp bodies, ball studs and covers, grounding cable, compression ferrules and three-way copper terminal block) similar to encl (2) in accordance with the following:

2.E.7.1. End-of-Line Station.

2.E.7.1.1. Primary Switchgear - Install 3 ea. ball studs with covers on phase connections where primary cables terminate. Install 1 ea. ball stud with cover on ground bus accessible to phase stud connections via supplied grounding cable.

2.E.7.1.2. Secondary Switchgear - Install 3 ea. ball studs with covers on bus phase connections after secondary main breaker. Install 1 ea. ball stud with cover on ground bus accessible to phase stud connections via supplied grounding cable.

2.E.7.2. Switching Station.

2.E.7.2.1. Primary Switchgear - Install 3 ea. ball studs with covers on phase connections in each cubicle where primary cables terminate. Install 1 ea. ball stud with cover on ground bus in various locations so that each group of 3 phase ball studs may connect to the ground ball stud via supplied grounding cable.

2.E.8. Cable entry into switchgear shall be sealed to prevent rodent entry. All spare conduit entry into switchgear shall be capped. All entries into switchgear from manholes shall be sealed in the manhole, including ducts with cables.

2.F. Relaying

2.F.1. Radial Circuits

2.F.1.1. Switching Station: 51, 51N very inverse time overcurrent relays.

2.F.1.2. End-of-Line Station: 50/51, 50/51N extremely inverse instantaneous and time overcurrent relays.

2.F.2. CT Ratios

2.F.2.1. 600:5 for overcurrent protection for 500 MCM cable (radial, tie circuits).

2.F.2.2. CT ratios for bus differential protection = the rating of the highest rated incoming circuit (not equal to bus rating).

2.F.2.3. CT ratio for end-of-line substation primary circuit overcurrent relays = (1.5) X (transformer primary full load current).

2.F.3. CT Type

2.F.3.1. Provide separate CT's for metering (metering accuracy) and relaying (relaying accuracy).

2.F.4. Installation

2.F.4.1. Meters and relays shall be mounted no lower than 2'-0" from the bottom of device to floor and no higher than 6'-0" from top of device to floor.

2.G. Metering

2.G.1. KWH Meters

2.G.1.1. Install a single kilowatthour (KWH) meter after the substation transformer secondary (low voltage side).

2.G.1.2. Provide additional KWH meters on secondary of transformer as required for billing purposes.

2.G.1.3. Install all meters (whether for billing purposes or for just an activity requirement) on the exterior of the building for meter reading purposes.

2.G.1.4. KWH meter shall have the following features:

2.G.1.4.1. Solid State type. Complete documentation shall be provided including installation, maintenance, testing and user manuals. Information regarding accessories and computer software shall also be provided. Solid state meter shall be a direct replacement for electro-mechanical or other solid state meters. Meter shall be provided with pulse output to allow for future remote metering. Meter display shall be capable of showing the following information:

2.G.1.4.1.1. Direction of energy flow

2.G.1.4.1.2. Presence of phase voltages

2.G.1.4.1.3. Electronic emulation of rotating disk in electromechanical meters.

2.G.1.4.2. Socket or switchboard mounting.

2.G.1.4.3. Class 10/20, 120V input (for safety) unless class 100 or 200 type.

2.G.1.4.4. With test switches installed for Class 10/20.

2.G.1.4.5. Required Form Designations for socket

2.G.1.4.5.1. Form 1S for single phase, 2W.

2.G.1.4.5.2. Form 2S for single phase, 3W.

2.G.1.4.5.3. Form 12S for Network 3W (2 phases and neutral), 120/208V (2 stator meter).

2.G.1.4.5.4. Form 15S for 3 phase, 3W Delta (2 stator meter).

2.G.1.4.5.5. Form 5S for 3 phase, 3W Delta (2 CT's, 2 stator meter).

2.G.1.4.5.6. Form 16S for 3 phase, 4W Wye (3 stator meter).

2.G. 1.4.5.7. Form 6S for 3 phase, 4W Wye (3 CT's, 2-1/2 stator meter).

2.G.1.4.5.8. Form 9S for 3 phase, 4W Wye (3 CT's, 3 stator meter).

2.G.2. Voltmeters

2.G.2.1. For end-of-line Station, provide voltmeters to monitor secondary bus. Purpose: To provide a visual indication of whether the bus is "hot".

2.G.3. Ammeters

2.G.3.1. For end-of-line Station serving facilities, provide 15 min. thermal demand ammeters with instantaneous scale (one per phase), on transformer primary or secondary. Purpose is to monitor loading on transformer. If delta system with majority or only 3 phase loads, a single thermal demand ammeter with instantaneous scale and ammeter switch is acceptable.

2.G.3.3. CT ratio for 500 MCM cable (radial, tie circuits) should be 400:5.

2.G.4. Accuracy Types

2.G.4.1. Provide separate CT's for metering (metering accuracy) and relaying (relaying accuracy).

2.G.5. Installation

2.G.5.1. Meters and relays shall be mounted no lower than 2'-0" from the bottom of device to floor and no higher than 6'-0" from the top of device to floor.

2.H. Primary Power Apparatus mVA rating

2.H.1. Equipment short circuit ratings shall be 125% of calculated fault, and not less than 100 mVA

2.I. Lightning Arresters

2.I.1. Pole mounted, 9 kV

2.I.2. Pad mounted equipment, 9 kV for use with elbow connectors fittings

2.J. 15 kV Cable splices and Terminations

2.J.1. Splices - prefabricated heat shrink type or slip on "elbow" style

2.J.2. Outdoor terminations - porcelain

2.J.3. Indoor terminations - prefabricated slip on

3. MANHOLES AND HANDHOLES

3.A. For New Manholes/Handholes:

3.A.1. Provide an "E" for Electric identification stamp on the cover.

3.A.2. Prevent surface water entry by elevating entry opening above surrounding terrain.

3.A.3. Coat exterior walls to prevent infiltration of liquids such as water and oil.

3.A.4. Provide closed sump if located below sea level or in liquid (water, oil etc.) saturated soil. Otherwise, provide open sump.

3.A.5. Seal all ducts entering manholes and handholes.

3.A.6 Do not install more than 8 primary cables in one manhole.

3.B. For New Manholes, provide:

3.B.1. An identification number (ex: B20) embedded on the manhole rim on at least four different locations. The Base Civil Engineer will provide the proper identification number.

3.B. 2. Minimum manhole size shall be 6'X11'. Use 8' octagonal manhole where multiple circuits and duct windows are required.

3.C. For new handholes, provide concrete covers to prevent unauthorized access.

4. OVERHEAD DISTRIBUTION SYSTEMS

4.A. For poles requiring down-guys, provide an anchor rod with a minimum diameter of 1 inch and concrete anchors.

4.B. Fuse cutouts shall be made of porcelain material.

5. TESTING OF HIGH VOLTAGE CABLES

5.A. Hi-Pot Testing

5.A.1. Conduct the tests in three phases: for the existing conductors, for the new conductors after installation but prior to splicing to existing conductors, and for the combined new and existing conductors after splicing.

5.A.2. New Cables: Use test voltage of 55 kV for 11.5 kV system cables. Specify that the Hi-Pot tests shall be performed in accordance with IEEE Standard 400 (IEEE Guide for Making High-Direct-Voltage Tests on Power Cable Systems in the Field). Utilize a maximum test voltage duration of 15 minutes.

5.A.3. Existing Cables/Existing Spliced to New Cables: Hi-Pot test for existing 11.5 kV system cables and combined new and existing cables after splicing shall be nondestructive and limited to a test voltage of 15 kV.

6. EMERGENCY EYEWASH EQUIPMENT

6.A. Emergency eyewash equipment shall conform with ANSI Z358.1 (Plumbed and Self Contained Eyewash).

7. WARNING SIGNS

7.A. Provide warning signs for new substations with equipment ratings that exceed 600 volts as required by ANSI Z35.1. Metal signs with the legend 'DANGER HIGH VOLTAGE KEEP OUT" shall be provided in three lines of nominal 3-inch high letters.

8. DUCT ASSIGNMENTS

8.A. The Base Civil Engineer will review and approve all cable routing proposals to coordinate and prevent conflicts in use of ducts. Design engineer is responsible for identification, and proposed routing and assignment.

ATTACHMENT #3

ENVIRONMENTAL LEAD PAINT AND ACM REPORT

Survey Report

INVESTIGATIVE ASBESTOS-CONTAINING MATERIAL (ACM) AND LEAD-CONTAINING PAINT (LCP) SURVEY FOR:

PHASE 1 UPGRADE ELECTRICAL DISTRIBUTION SYSTEM AT HICKAM AIR FORCE BASE

Prepared For:

MK Engineers, Ltd.
286 Kalihi Street
Honolulu, Oahu, Hawaii 96819

Prepared By:

Edward K. Noda and Associates, Inc.
615 Piikoi Street, Suite 300
Honolulu, Hawaii 96814-3139

Project No. 2396-01F
January 2004

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APPENDICES

INVESTIGATIVE ASBESTOS-CONTAINING MATERIAL (ACM) AND LEAD-CONTAINING PAINT (LCP) SURVEY FOR THE PHASE 1 UPGRADE ELECTRICAL DISTRIBUTION SYSTEM, HICKAM AIR FORCE BASE

I. EXECUTIVE SUMMARY

Edward K. Noda and Associates, Inc. (EKNA) was retained by MK Engineers, Ltd. to conduct an asbestos-containing material (ACM) and lead-containing paint (LCP) inspection/survey of the electrical distribution system at Hickam Air Force Base. For this report, the LCP survey differs from a lead-based paint (LBP) survey in that the threshold criteria for LBP is 1.0 milligrams lead per square centimeter (mg/cm^2) of paint, whereas the LCP survey looks for any detectable concentration of lead in paint. The objective of this project was to determine the existence and extent of ACM and LCP which may be disturbed during proposed demolition and renovation.

LEAD-CONTAINING PAINTS

Paint chip analysis indicates that LCP is present on the following building component types:

Back station

- Grey paint on interior floor.
- Tan paint on the interior walls.
- Grey paint on the electrical panels.

TS-2013

- Tan paint on exterior wall.
- Brown paint on exterior wall.

Slab at New substation

- Blue paint on slab.
- Yellow paint on slab
- Red paint on slab

ASBESTOS-CONTAINING MATERIALS

The following materials were found to contain asbestos at a concentration greater than one percent (>1%):

- White pipe insulation in manholes 1072-A and 1072-B.
- Cementitious pipe sleeves (conduit) in all manholes.

Note: Manholes F-1, A-25, 1072-C, B-23, and B-23A were opened and visually inspected but could not be sampled due to high water levels within their interior spaces.

II. INTRODUCTION

EKNA was retained by MK Engineers, Ltd. to conduct an ACM and LCP inspection/survey of the electrical distribution system at the Hickam Air force Base. The objective of the survey was to determine the existence and extent of ACM and LCP where the proposed demolition and renovation work may occur.

EKNA utilized an Environmental Protection Agency (EPA) Asbestos Hazard Emergency Response Act (AHERA) accredited inspector to perform the ACM survey, and an EPA accredited lead risk assessor to conduct the LCP survey.

The scope of work for this survey included providing a survey report which includes:

- A summary of the inspection activities.
- Drawings identifying LCP and ACM sampling locations.
- All sample analysis reports.
- Recommendations for abatement and disposal of ACMs and LCPs, if found.

III. SURVEY AND SAMPLING METHODOLOGY

On January 15, 2004, EKNA's Environmental Protection Agencies (EPA) accredited lead risk assessor and Hawaii certified asbestos inspector, Steven K. Chun (see Appendix D for Inspector Certificates), visited the project site to investigate for the presence of LCP and conduct an investigative ACM survey for the electrical distribution system upgrade at Hickam Air Force Base. EKNA conducted the on-site survey by visually assessing suspect paint types, collecting representative paint chip samples, and by collecting samples of suspect ACMs.

EKNA collects each sample utilizing a variety of sampling tools, to ensure that each sample contains all layers of the suspect paint type or suspect ACM. Each sample is placed in an individual zip-lock plastic bag, sealed, and labeled with a unique sample identification number. Samples were analyzed at NVL Laboratories, Inc. (NVL) of Seattle, Washington, to determine lead or asbestos content as appropriate. NVL participates in the American Industrial Hygiene Association (AIHA) Environmental Lead Laboratory Accreditation Program (ELLAP) for lead and the National Institute of Standards and Technology (NIST), National Voluntary Laboratory Accreditation Program (NVLAP) mandated by EPA under the AHERA regulations.

LEAD-CONTAINING PAINTS

EKNA collected eight (8) paint chip samples for laboratory analysis. The samples were obtained by identifying a particular color/type of paint, then collected and placed into a sample bag for that particular paint color/type. When a sample indicates the presence of lead above the analytical limit of detection (LOD), then the building component with that paint color/type is considered to contain lead at some concentration. Rather than trying to pinpoint exact locations of LCP, which can be a labor and cost intensive effort, the user can readily assume that particular paint color/type contains lead at some concentration.

ASBESTOS-CONTAINING MATERIALS

EKNA collected a total of eighteen (18) samples of suspect asbestos-containing materials. The asbestos samples were analyzed using EPA methods described in EPA 660/R-93/116 utilizing Polarized Light Microscopy (PLM). Using the PLM method, the analyst is able to determine the type and concentration of asbestos in each sample. The concentration is provided as a percentage of the total area (total area is determined by the field of view while observed through the microscope) of the sample material. The limit of detection for this particular method is <1%.

Primary guidance for conducting asbestos surveys is provided by the Asbestos Hazard Emergency Response Act (AHERA), a federal law (40 CFR Part 763) instituted to regulate asbestos in schools. In addition to AHERA, the EPA has published a document titled "Guidance for Controlling Asbestos-Containing Materials in Buildings" (Document number EPA 560/5-85-024) for buildings which are not governed by the AHERA legislation. State of Hawaii Department of Health regulations under the Hawaii Administrative Rules (Title 11, Chapters 501 through 504) also apply.

One of the most important characteristics of a material that AHERA and the EPA both address, is the concept of "friability". AHERA describes materials as "friable" if, when dry, they may be crumbled, pulverized, or reduced to powder by hand pressure. The term includes previously non-friable material after it becomes damaged to the extent that when dry it may be crumbled, pulverized, or reduced to powder by hand pressure.

Three samples of each homogeneous suspect asbestos-containing material are required to be collected by Hawaii law. A homogenous sampling material (HSM) is defined as a material with similar location, function, thickness and color within the building space, in accordance with the AHERA sampling protocol. HSM is analogous to the term "homogeneous area" as defined in AHERA. For example, the pipe runs of a hot water system would be a single HSM provided that the material does not differ in appearance, color, or texture throughout the system. When a system or area appears to consist of dissimilar materials, then the system or area is separated into as many HSMs as necessary to define all suspect materials present.

When two HSMs are similar in appearance or texture but cannot be described uniquely, a type number is assigned to differentiate them. For example, HSMs similar in appearance may be identified as Type I and Type II (e.g., Brown Vinyl Floor Tile - Type I, Brown Vinyl Floor Tile - Type II, etc.). This procedure minimizes the potential for incorrect conclusions based exclusively upon the appearance of the material.

After completing an inventory of building materials and determining the type and extent of HSMs, EKNA collected at least three samples of each HSM. The age and appearance of each HSM encountered were considered to ensure appropriate identification and sampling. Each sample was placed in an individual sample bag, sealed and labeled with a unique sample identification number. Sample locations are depicted in drawings of the buildings provided in Appendix A.

All samples were submitted to NVL Laboratories, Inc. of Seattle, Washington, for analysis to determine asbestos content. NVL Laboratories, Inc. participates in the National Institute of Standards and Technology (NIST), National Voluntary Laboratory Accreditation Program (NVLAP) mandated by EPA under the AHERA regulations.

The samples were analyzed according to EPA methods described in EPA 660/R-93/116 utilizing Polarized Light Microscopy (PLM). Using the PLM method, the analyst is able to determine the type and concentration of asbestos in each sample.

Each layer in a sample is viewed and analyzed by NVL as a distinct material, and analysis results include the asbestos percentages in each layer of the suspect material. The individual layer information is important because in a multi-layered sample, only a single layer may contain asbestos. By referencing the layer description in the Bulk Asbestos Fiber Analysis reports, the user can distinguish the layer(s) in which asbestos occurs.

The asbestos concentration present is provided as a percentage of the total area (total area is determined by the field of view while observed through the microscope) of the sample material. The limit of detection for the PLM method is less than one percent (<1%). As with most analytical techniques there is a variance associated with the analysis and for this reason, the reported asbestos concentrations lie within a reliable range. Where results are reported as "<1%" or "Trace", this indicates that at least one asbestos fiber was detected. Where results are reported as "No Asbestos Detected" or "ND", no asbestos fibers were found.

IV. SURVEY FINDINGS

A. <u>LEAD-CONTAINING PAINTS</u>

Composite paint chip analysis indicates that LCP is present on the following building component types:

Back station

- Grey paint on interior floor.
- Tan paint on the interior walls.
- Grey paint on the electrical panels.

TS-2013

- Tan paint on exterior wall.
- Brown paint on exterior wall.

Slab at New substation

- Blue paint on slab.
- Yellow paint on slab
- Red paint on slab

B. ASBESTOS-CONTAINING BUILDING MATERIALS

The following materials were found to contain asbestos at a concentration greater than one percent:

- Approximately 60 linear feet of white pipe insulation in manholes 1072-A and 1072-B.
- Cementitious pipe sleeves (conduit) in all manholes (unknown quantity).

Note: Manholes F-1, A-25, 1072-C, B-23, and B-23A were opened and visually inspected but could not be sampled due to high water levels within their interior spaces.

V. LIMITATIONS

This survey involved the identification of accessible painted surfaces and asbestos and non-asbestos materials which may be disturbed during the proposed demolition and renovation work. Sampling techniques were limited to acquisition of samples sufficient for laboratory analysis.

This survey does not constitute a final statement as to the occurrence and/or extent of all LCP or ACM. Undetected LCP or ACM may be present in inaccessible areas such as underground tunnels, materials within solid wall or ceiling cavities, or materials encased in concrete.

Note: Manholes F-1, A-25, 1072-C, B-23, and B-23A were opened and visually inspected but could not be sampled due to high water levels within their interior spaces.

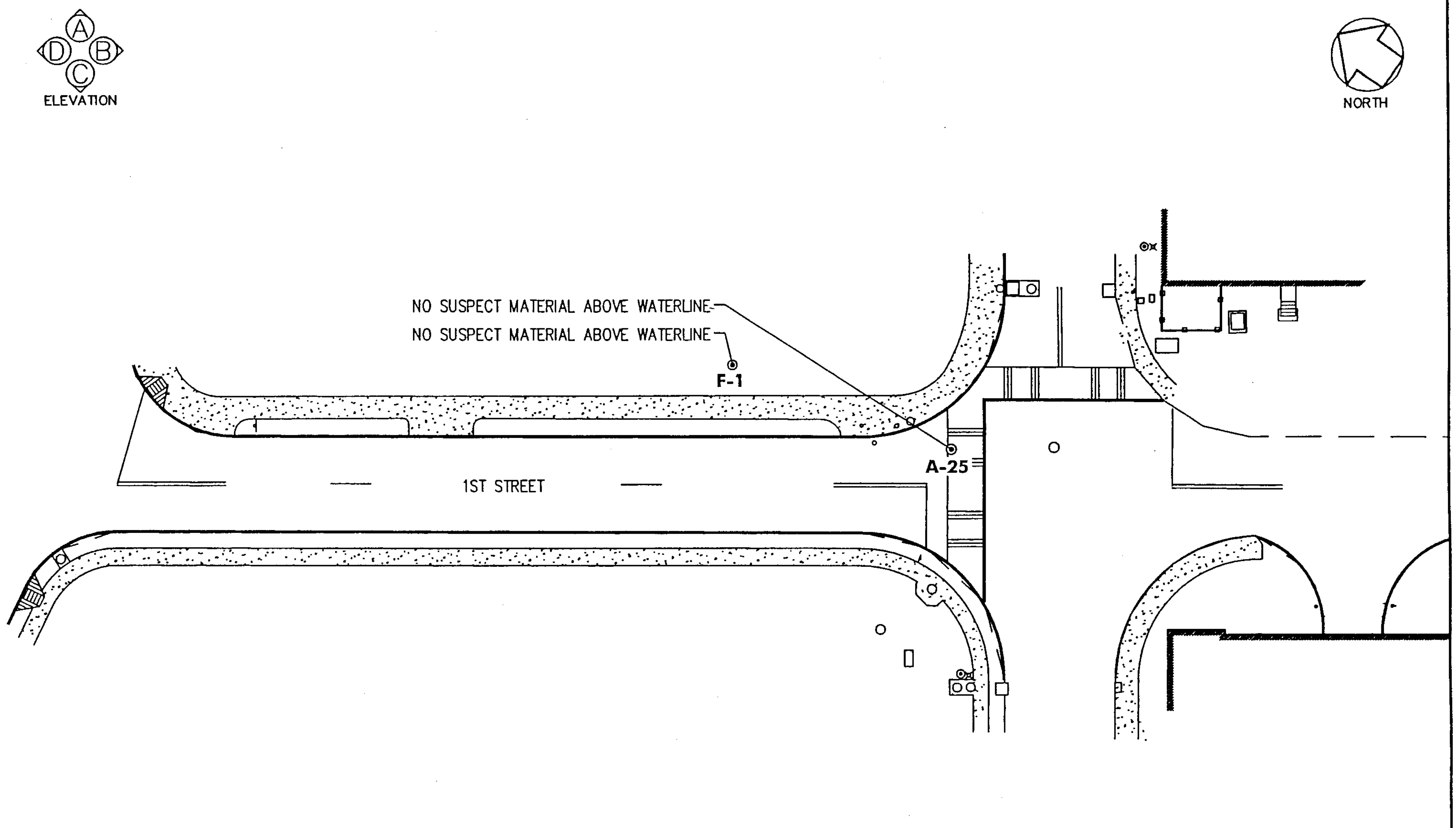
The information set forth is based solely on the agreed upon scope of services. This information is based on personal observation and the results of the LCP and ACM survey. Edward K. Noda and Associates, Incorporated expressly disclaims any and all liability representations, expressed, or implied, contained in, or for omissions from this report, or any other written or oral communication which might be interpreted as establishing the total extent of all liability present at the subject property.

Our services have been performed with the usual thoroughness and competence of the consulting profession, in accordance with the standards of professional services at this time. No other warranty or representation, either expressed or implied, is included or intended.

EDWARD K. NODA AND ASSOCIATES, INC.

APPENDIX A

PAINT CHIP AND ASBESTOS SAMPLE LOCATIONS



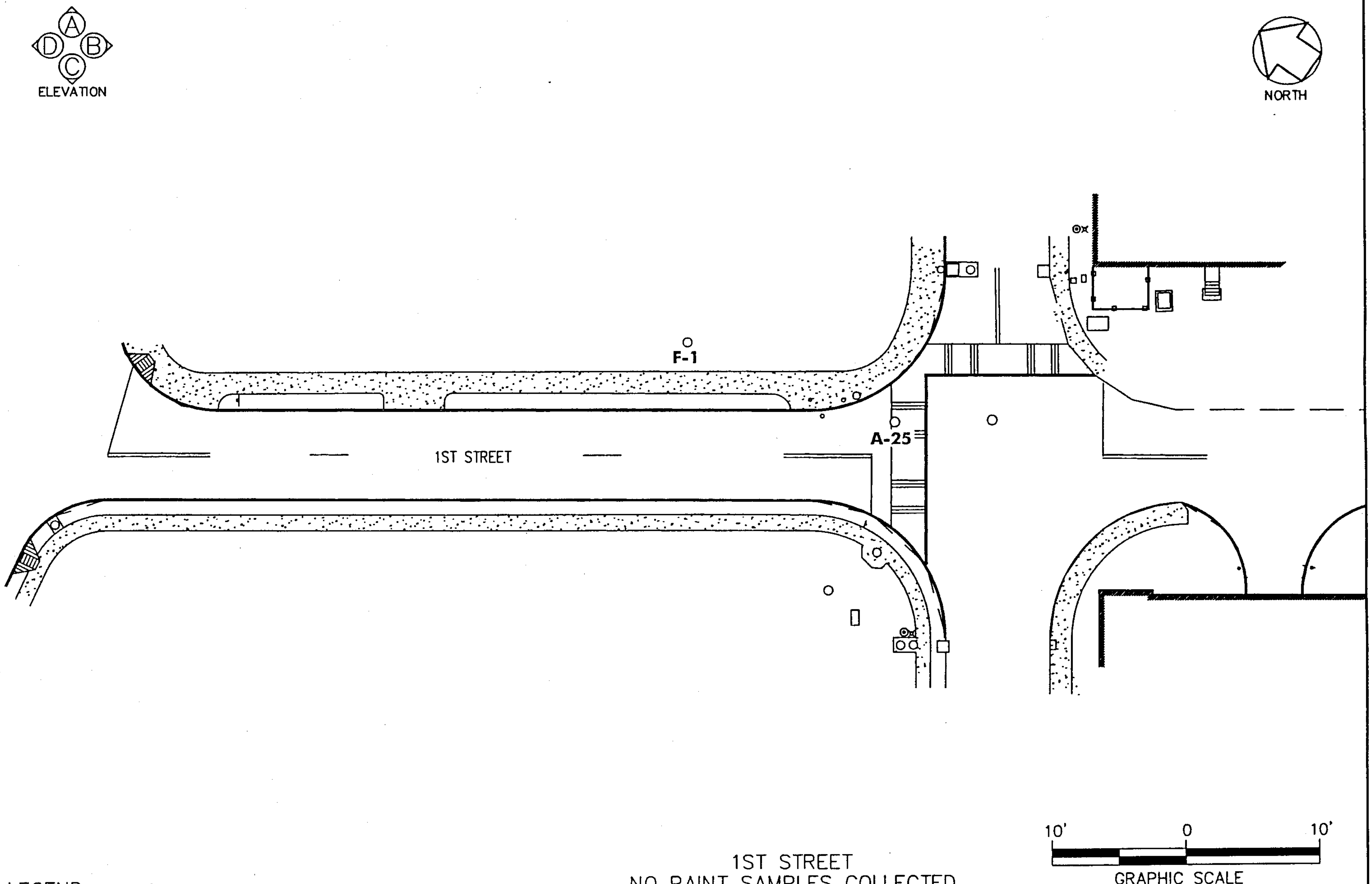
NOTE: MANHOLES F-1 AND A-25 WERE OPENED AND VISUALLY INSPECTED BUT COULD NOT BE SAMPLED DUE TO HIGH WATER LEVELS WITHIN THEIR INTERIOR SPACES.

LEGEND

239601-A-00= INDICATES SAMPLE CONTAINING NO ASBESTOS

239601-A-00 = INDICATES SAMPLE WHICH CONTAINS GREATER THAN ONE PERCENT (>1%) ASBESTOS

Edward K. Noda and Associates, Inc. 615 PIIKOI STREET, SUITE 300, HONOLULU, HAWAII, 96814	INVESTIGATIVE ASBESTOS-CONTAINING MATERIAL AND LEAD-CONTAINING PAINT SURVEY FOR THE PHASE 1 UPGRADE ELECTRICAL DISTRIBUTION SYSTEM, HICKAM AIR FORCE BASE	ASBESTOS SAMPLE LOCATIONS	FIGURE A-1

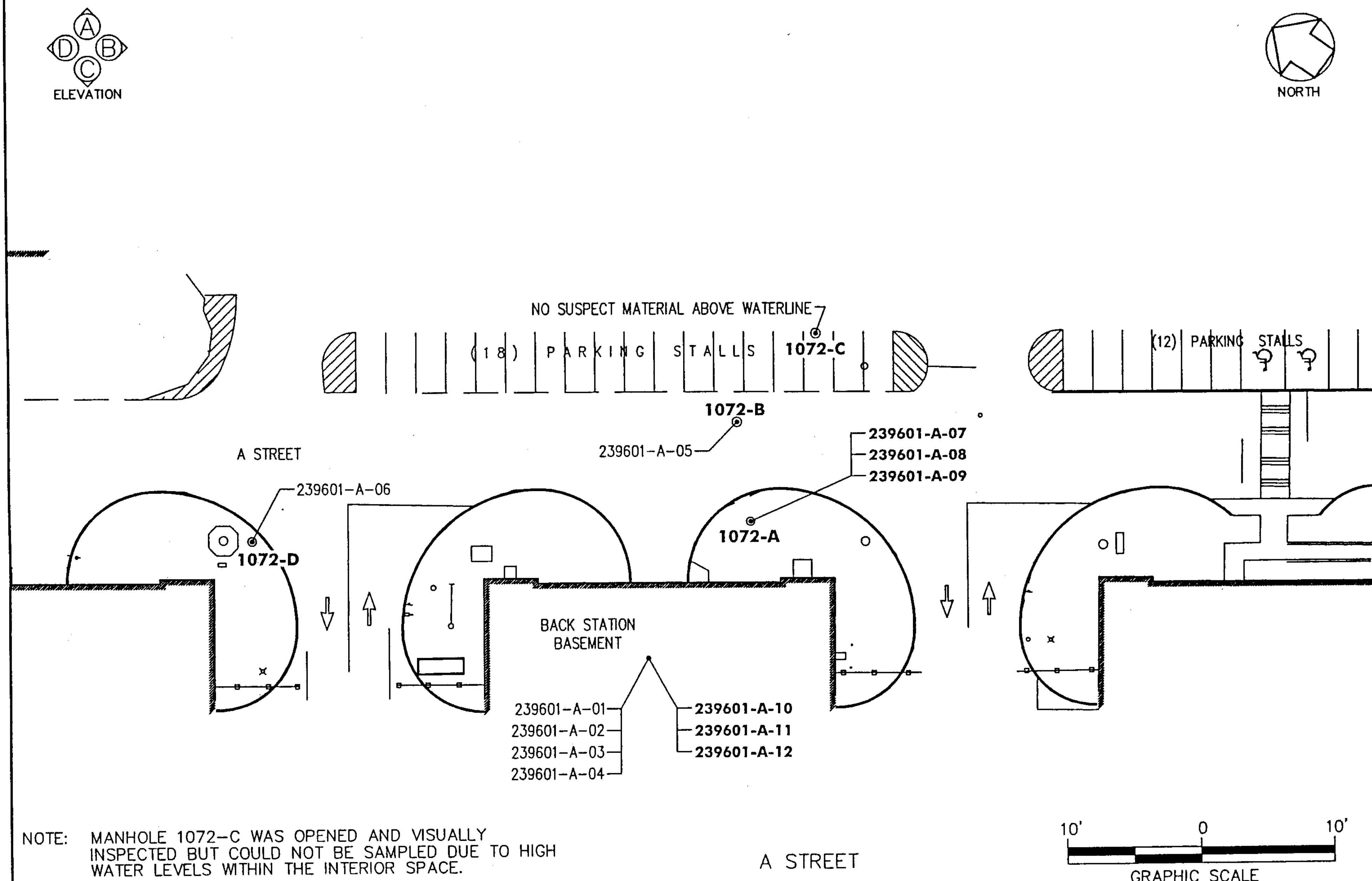


1ST STREET
NO PAINT SAMPLES COLLECTED

LEGEND

239601-L-00 = INDICATES SAMPLE WITH CONCENTRATION ABOVE THE AAS ANALYTICAL LIMIT OF DETECTION

Edward K. Noda and Associates, Inc. 615 PIIKOI STREET, SUITE 300, HONOLULU, HAWAII, 96814	INVESTIGATIVE ASBESTOS-CONTAINING MATERIAL AND LEAD-CONTAINING PAINT SURVEY FOR THE PHASE 1 UPGRADE ELECTRICAL DISTRIBUTION SYSTEM, HICKAM AIR FORCE BASE	**PAINT CHIP SAMPLE LOCATIONS**	FIGURE **P-1**



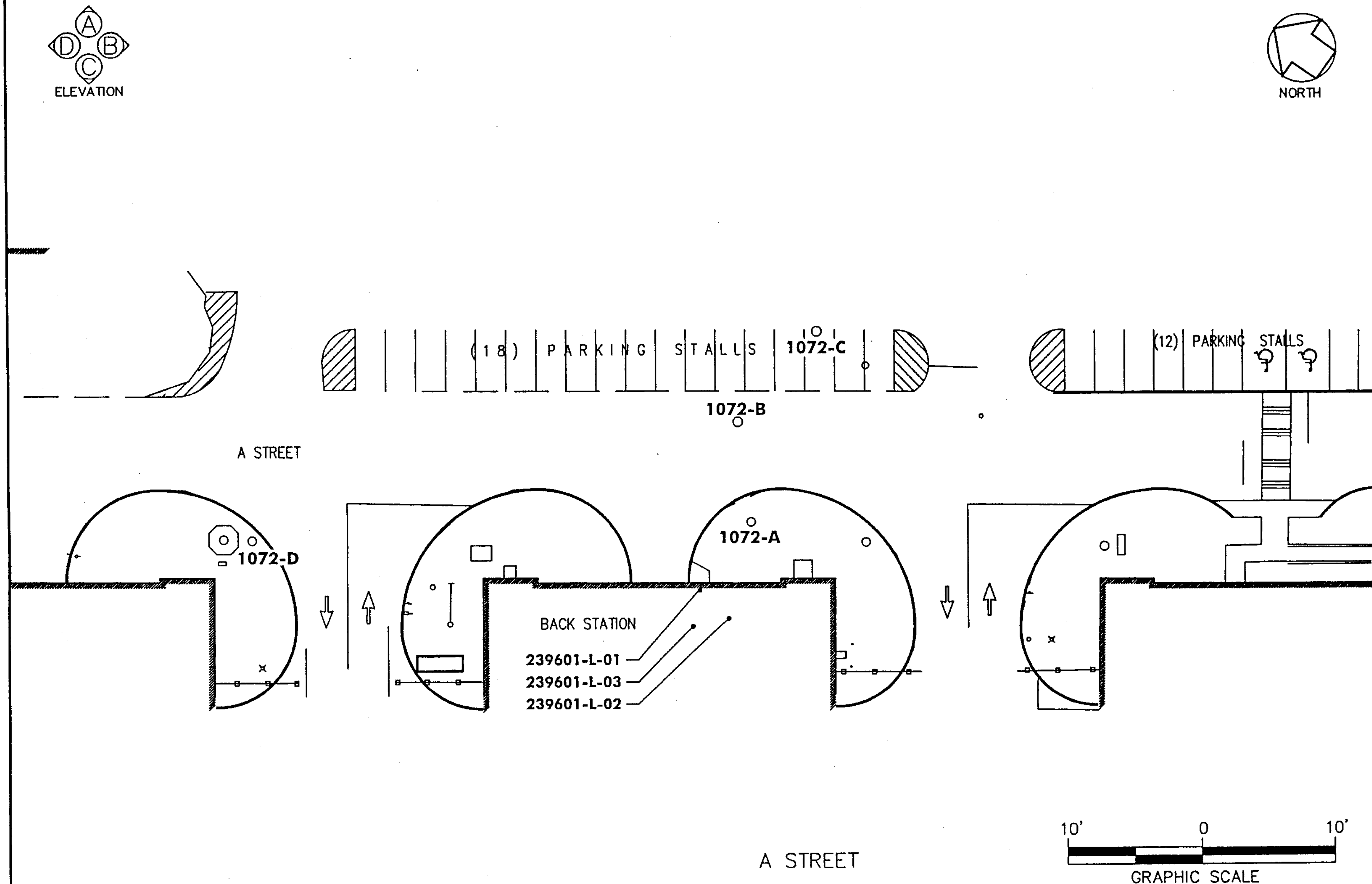
NOTE: MANHOLE 1072-C WAS OPENED AND VISUALLY INSPECTED BUT COULD NOT BE SAMPLED DUE TO HIGH WATER LEVELS WITHIN THE INTERIOR SPACE.

LEGEND

239601-A-00= INDICATES SAMPLE CONTAINING NO ASBESTOS

239601-A-00 = INDICATES SAMPLE WHICH CONTAINS GREATER THAN ONE PERCENT (>1%) ASBESTOS

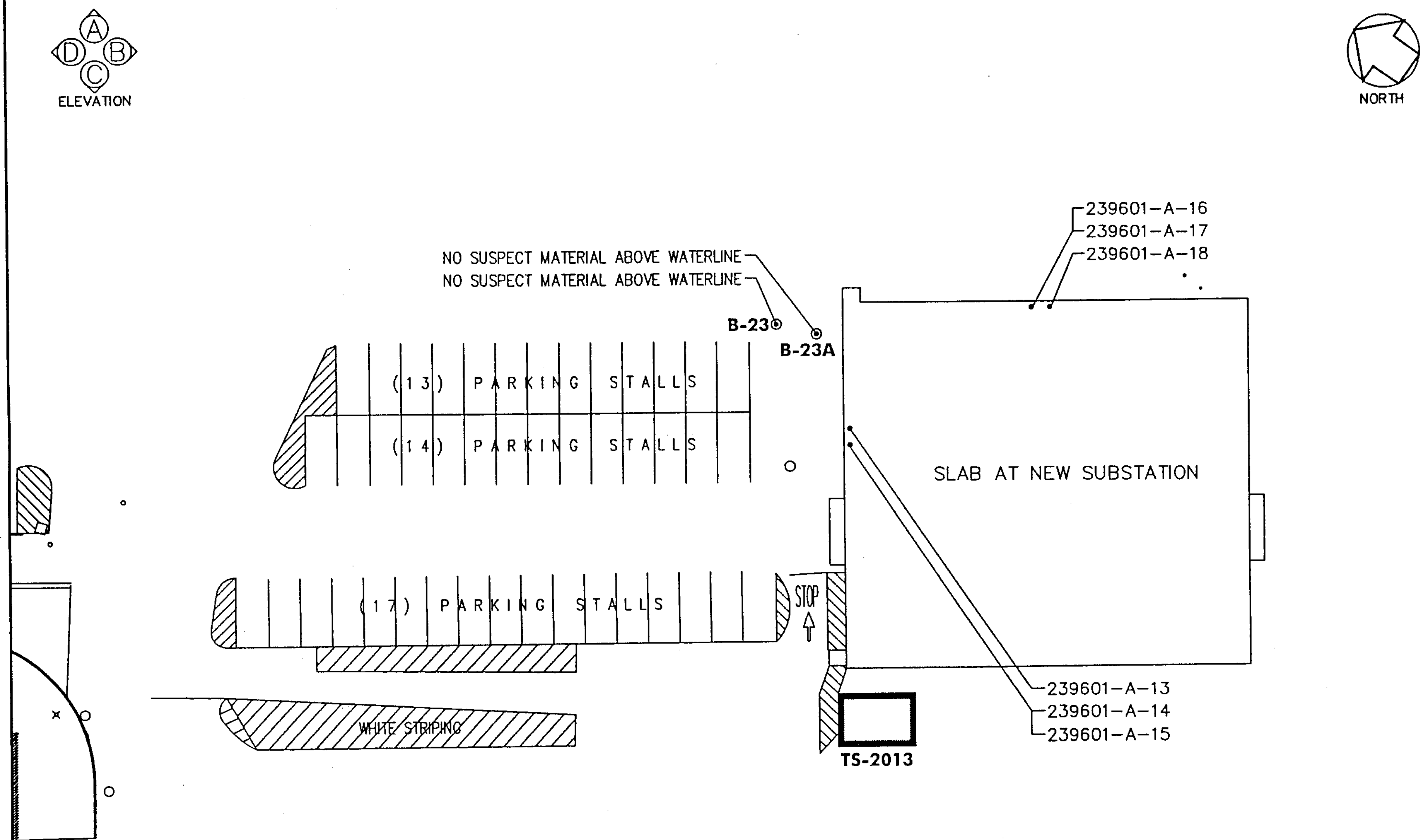
Edward K. Noda and Associates, Inc. 615 PIIKOI STREET, SUITE 300, HONOLULU, HAWAII, 96814	INVESTIGATIVE ASBESTOS-CONTAINING MATERIAL AND LEAD-CONTAINING PAINT SURVEY FOR THE PHASE 1 UPGRADE ELECTRICAL DISTRIBUTION SYSTEM, HICKAM AIR FORCE BASE	ASBESTOS SAMPLE LOCATIONS	FIGURE A-2



LEGEND

239601-L-00 = INDICATES SAMPLE WITH CONCENTRATION ABOVE THE AAS ANALYTICAL LIMIT OF DETECTION

Edward K. Noda and Associates, Inc. 615 PIIKOI STREET, SUITE 300, HONOLULU, HAWAII, 96814	INVESTIGATIVE ASBESTOS-CONTAINING MATERIAL AND LEAD-CONTAINING PAINT SURVEY FOR THE PHASE 1 UPGRADE ELECTRICAL DISTRIBUTION SYSTEM, HICKAM AIR FORCE BASE	PAINT CHIP SAMPLE LOCATIONS	FIGURE P-2



NOTE: MANHOLES B-23 AND B-23A WERE OPENED AND VISUALLY INSPECTED BUT COULD NOT BE SAMPLED DUE TO HIGH WATER LEVELS WITHIN THEIR INTERIOR SPACES.

SLAB AT NEW SUBSTATION

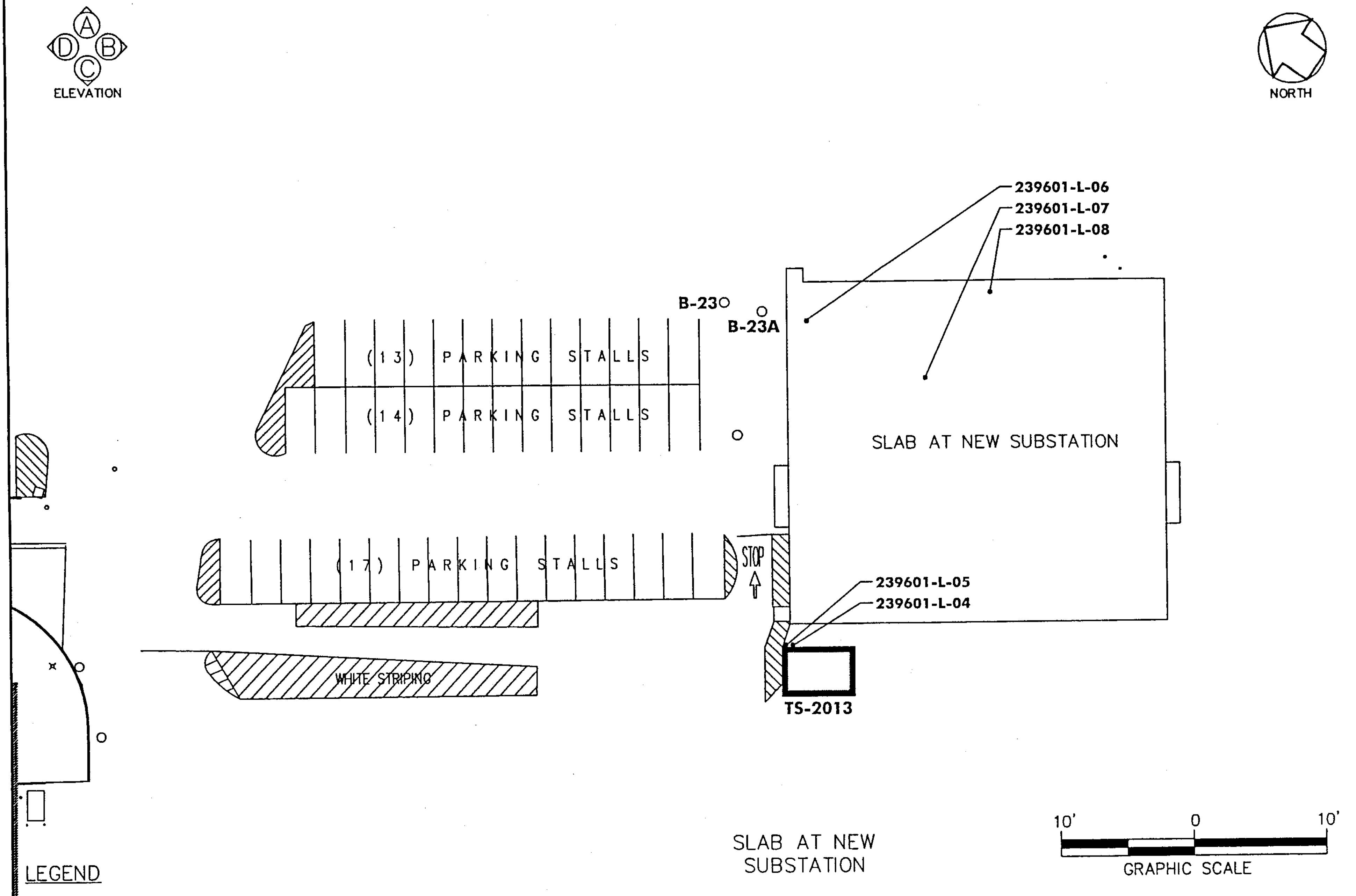
10' 0 10'
GRAPHIC SCALE

LEGEND

239601-A-00= INDICATES SAMPLE CONTAINING NO ASBESTOS

239601-A-00 = INDICATES SAMPLE WHICH CONTAINS GREATER THAN ONE PERCENT (>1%) ASBESTOS

Edward K. Noda and Associates, Inc. 615 PIIKOI STREET, SUITE 300, HONOLULU, HAWAII, 96814	INVESTIGATIVE ASBESTOS-CONTAINING MATERIAL AND LEAD-CONTAINING PAINT SURVEY FOR THE PHASE 1 UPGRADE ELECTRICAL DISTRIBUTION SYSTEM, HICKAM AIR FORCE BASE	ASBESTOS SAMPLE LOCATIONS	FIGURE A-3



LEGEND

239601-L-00 = INDICATES SAMPLE WITH CONCENTRATION ABOVE THE AAS ANALYTICAL LIMIT OF DETECTION

Edward K. Noda and Associates, Inc. 615 PIIKOI STREET, SUITE 300, HONOLULU, HAWAII, 96814	INVESTIGATIVE ASBESTOS-CONTAINING MATERIAL AND LEAD-CONTAINING PAINT SURVEY FOR THE PHASE 1 UPGRADE ELECTRICAL DISTRIBUTION SYSTEM, HICKAM AIR FORCE BASE	PAINT CHIP SAMPLE LOCATIONS	FIGURE P-3

APPENDIX B

PAINT CHIP SAMPLE CHAIN OF CUSTODY FORMS AND ANALYTICAL RESULTS

EDWARD K. NODA AND ASSOCIATES

LEAD PAINT CHAIN OF CUSTODY FORM

SHEET 1 OF 1

BATCH ID 2400567.00

BLDG. NAME & PROJECT NAME: Corps IDIQ Electrical (DACA83-03-R-0017); Upgrade Electrical System Phase I, Hickam Air Force Base

	SAMPLE I.D. NO.	TYPE*	FLOOR #	ROOM EQUIV.	SAMPLE COMB.	MATERIAL DESCRIPTION
1	239601-L-01	P	First	Back Station	Interior Floor	Grey Paint
2	239601-L-02	P	First	Back Station	Interior Wall	Tan Paint
3	239601-L-03	P	First	Back Station	Interior Wall	Grey Paint - ELEC.
4	239601-L-04	P	First	TS-2013	Exterior Wall	Tan Paint
5	239601-L-05	P	First	TS-2013	Exterior Wall	Brown Paint
6	239601-L-06	P	Slab	New Substation	Exterior Floor	Blue Paint
7	239601-L-07	P	Slab	New Substation	Parking Line	Yellow Paint
8	239601-L-08	P	Slab	New Substation	Exterior Floor	Red Paint

ANALYTICAL LABORATORY RESULTS

	LAB I.D. NO.	EPA METHOD	REPORT LIMIT	SAMPLE RESULT	COMMENTS
1					
2					
3					
4					
5					
6					
7					
8					

ADDITIONAL COMMENTS & NOTES: AREA = 4 SQUARE INCHES
REPORT RESULTS IN MG/CM²

*SAMPLE TYPE CODES

P = PAINT CHIP SAMPLE
D = DEBRIS SAMPLE
SD/W = SURFACE DUST - WIPE SAMPLE
SD/V = SURFACE DUST - VACUUM SAMPLE
S = SOIL SAMPLE
W = WATER SAMPLE

ACCOUNTABILITY RECORD

REQUESTED COMPLETION DATE: 20 JAN 2004
JOB NO.: 2396-01F BATCH NO. EKNA01570
CLIENT NAME: MK ENGINEERS, INC.
SAMPLER'S NAME: Steven K. Chun
SIGNATURE:
DATE: 15 JAN 2004 TIME COMPLETED: 1200
DELIVERED TO LAB BY: DHL
DATE: 15 JAN 2004

LAB NAME: NVL Laboratories, Inc.
ADDRESS: 4708 Aurora Avenue, Seattle, WA 98103
RECEIVED BY:
DATE: 1-16-04 TIME: 1130 INITIALS:
ANALYZED BY: 1/19/04 1325
LAB Q.C. APPROVAL: NL
PROJECT MANAGER'S APPROVAL:
DATE:

APPROVAL SIGNATURE (PROJECT MANAGER):

NVL Laboratories, Inc.
4708 Aurora Ave. N., Seattle, WA 98103
Tel: 206.547.0100, Fax: 206.634.1936
www.nvllabs.com

AIHA - IH #101861

AIHA Environmental Lead and Industrial Hygiene ACCREDITED LABORATORY

Analysis Report

Total Lead (Pb)

Client: EKNA Services, Inc.
Address: 615 Piikoi Street, Suite 300
Honolulu, HI 96814 -3139
Attention: Mr. Steven Chun
Project Location: Corps IDIQ Electrical (DACA83-03-R-0017); Upgrade Electrical System Phase 1, Hickam Air Force Base

Batch #: 2400567.00
Matrix: Paint Chips (Area)
Method: EPA 7000B
Client Project #:2396-01F
Samples Received: 8
Total Samples Analyzed:8

Lab ID	Client Sample #	Sample Area (cm2)	RL in mg/cm2	Results mg/cm2
24002624	239601-L-01	25.80	0.00090	0.05000
24002625	239601-L-02	25.80	0.00090	0.88000
24002626	239601-L-03	25.80	0.00040	0.02000
24002627	239601-L-04	25.80	0.00090	0.26000
24002628	239601-L-05	25.80	0.00090	0.16000
24002629	239601-L-06	25.80	0.00040	0.00200
24002630	239601-L-07	25.80	0.00040	0.42000
24002631	239601-L-08	25.80	0.00040	0.39000

Sampled by: Client
Analyzed by: Holly Tuttle Date: 01/19/2004
Reviewed by: Nick Ly Date: 01/20/2004

Nick Ly, Technical Director

mg =Milligrams
cm2 = Square centimeter

RL = Reporting Limit
'<' = Below the reporting Limit

Bench Run No: 24-0119-3

APPENDIX C

ASBESTOS BULK SAMPLE CHAIN OF CUSTODY FORMS AND ANALYTICAL RESULTS

ASBESTOS BULK SAMPLE CHAIN OF CUSTODY FORM

SHEET 1 OF 2

PROJECT: Corps IDIQ Electrical (DACA83-03-R-0017); Upgrade Electrical System Phase I, Hickam Air Force Base

	SET	SAMPLE I.D. NO	FLOOR	AREA/ROOM	ELEV	POSITION NO.	MATERIAL DESCRIPTION
1	1	239601-A-01	Vault	Back Station	N/A	N/A	White Wrap on Piping
2	1	239601-A-02	Vault	Back Station	N/A	N/A	White Wrap on Piping
3	1	239601-A-03	Vault	Back Station	N/A	N/A	White Wrap on Piping
4	2	239601-A-04	Vault	Back Station	N/A	N/A	Black Wrap on Piping
5	2	239601-A-05	Manhole	1072B	N/A	N/A	Black Wrap on Piping
6	2	239601-A-06	Manhole	1072D	N/A	N/A	Black Wrap on Piping
7	3	239601-A-07	Manhole	1072A	N/A	N/A	White Insulation on Piping
8	3	239601-A-08	Manhole	1072A	N/A	N/A	White Insulation on Piping
9	3	239601-A-09	Manhole	1072A	N/A	N/A	White Insulation on Piping
10							

ANALYTICAL LABORATORY RESULTS

	LAB I.D. NO.	CH	AM	CR	AC	AN	TR	COMMENTS
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								

BATCH ID
2400569.00

ADDITIONAL COMMENTS & NOTES

Please fax results at (808) 593-8551

Edward K. Noda
And Associates, Inc.

ACCOUNTABILITY RECORD

REQUESTED COMPLETION DATE: 20 JAN 2004
JOB NO.: 2396-01F BATCH NO. EKNA01569
CLIENT NAME: MK ENGINEERS, INC.
SAMPLER'S NAME: STEVEN K. CHUN
SIGNATURE:
DATE: 15 JAN 2004 TIME COMPLETED: 1200
DELIVERED TO LAB BY: DHL DATE: 15 JAN 2004

LAB NAME: NVL Laboratories, Inc.
ADDRESS: 4708 Aurora Avenue, Seattle, WA 98103
RECEIVED BY: M. Stroth
DATE: 1-16-04 TIME: [illegible] INITIALS:
ANALYZED BY:
LAB Q.C. APPROVAL: NL
DATE: 1/19/4

ASBESTOS BULK SAMPLE CHAIN OF CUSTODY FORM

PROJECT: Corps IDIQ Electrical (DACA83-03-R-0017); Upgrade Electrical System Phase I, Hickam Air Force Base

	SET	SAMPLE I.D. NO	FLOOR	AREA/ROOM	ELEV	POSITION NO.	MATERIAL DESCRIPTION
1	4	239601-A-10	Vault	Back Station	N/A	N/A	Cementitious Pipe Sleeve
2	4	239601-A-11	Vault	Back Station	N/A	N/A	Cementitious Pipe Sleeve
3	4	239601-A-12	Vault	Back Station	N/A	N/A	Cementitious Pipe Sleeve
4	5	239601-A-13	Slab	New Substation	N/A	N/A	12"x12" Vinyl Floor tile
5	5	239601-A-14	Slab	New Substation	N/A	N/A	12"x12" Vinyl Floor tile
6	5	239601-A-15	Slab	New Substation	N/A	N/A	12"x12" Vinyl Floor tile
7	6	239601-A-16	Slab	New Substation	N/A	N/A	Black Rubber Flooring
8	6	239601-A-17	Slab	New Substation	N/A	N/A	Black Rubber Flooring
9	6	239601-A-18	Slab	New Substation	N/A	N/A	Black Rubber Flooring
10							

ANALYTICAL LABORATORY RESULTS

	LAB I.D. NO.	CH	AM	CR	AC	AN	TR	COMMENTS
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								

ADDITIONAL COMMENTS & NOTES

Please fax results at (808) 593-8551

ACCOUNTABILITY RECORD

Edward K. Noda And Associates, Inc.

REQUESTED COMPLETION DATE: 20 JAN 2004
JOB NO.: 2396-01F BATCH NO. EKNA01569
CLIENT NAME: MK ENGINEERS, INC.
SAMPLER'S NAME: STEVEN K. CHUN
SIGNATURE:
DATE: 15 JAN 2004 TIME COMPLETED: 1200
DELIVERED TO LAB BY: DHL DATE: 15 JAN 2004

LAB NAME: NVL Laboratories, Inc.
ADDRESS: 4708 Aurora Avenue, Seattle, WA 98103
RECEIVED BY: M. Stenson
DATE: 1-16-04 TIME: 1:30 INITIALS:
ANALYZED BY:
LAB Q.C. APPROVAL:
DATE: 1/19/04

NVL Laboratories, Inc.
4708 Aurora Ave N, Seattle, WA 98103
Tel: 206.547.0100 Emerg.Pager: 206.344.1878
Fax: 206.634.1936 1.888.NVL.LABS (685.5227)

CHAIN of CUSTODY SAMPLE LOG

NVL LABS

Client: EKNA Services, Inc.
Address: 615 Piikoi Street, Suite 300
Honolulu, HI 96814 -3139
Project Manager: Mr. Steven Chun
Project Location: Corps IDIQ Electrical (DACA83-03-R-0017); Upgrade Electrical System Phase 1, Hickam
Phone: (808) 591-8553 Fax: (808) 593-8551

NVL Batch Number: 2400569.00
Client Job Number: 2396-01F
Total Samples: 18 Rush Samples:
Turn Around Time 1: 2 Days Rush TAT:
Due Date: 1/20/2004 Time: 1:30 PM
Email address:

☐ Asbestos Air | ☐ PCM (NIOSH 7400) ☐ TEM (NIOSH 7402) ☐ TEM (AHERA) ☐ TEM (EPA Level II) ☐ Other

☒ Asbestos Bulk | ☒ PLM (EPA/600/R-93/116) ☐ PLM (EPA Point Count) ☐ PLM (EPA Gravimetry) ☐ TEM BULK

☐ Mold/Fungus ☐ Mold Air ☐ Mold Bulk ☐ Rotometer Calibration

METALS	Det. Limit	Matrix		RCRA Metals	☐ All 8	Other Metals
☐ Total Metals	☐ ppm (AAS)	☐ Air Filter	☐ Paint Chips in cm2	☐ Arsenic (As)	☐ Lead (Pb)	☐ All 3
		☐ Drinking water	☐ Waste Water	☐ Barium (Ba)	☐ Mercury (Hg)	☐ Copper (Cu)
☐ TCLP	☐ ppb (GFAA)	☐ Dust/wipe (Area)	☐ Other	☐ Cadmium (Cd)	☐ Selenium (Se	☐ Nickel (Ni)
		☐ Soil		☐ Chromium (Cr)	☐ Silver (Ag)	☐ Zinc (Zn)
		☐ Paint Chips in %				

☐ Other Types of Analysis | ☐ Fiberglass ☐ Silica ☐ Nuisance Dust ☐ Respirable Dust ☐ Other (Specify)

Condition of Package ☒ Good ☐ Damaged (no spillage) ☐ Severe damage (spillage)

	Lab ID	Client Sample Number	Comments (e.g Sample area, Sample Volume, etc)	A/R
1	24002638	239601-A-01		A
2	24002639	239601-A-02		A
3	24002640	239601-A-03		A
4	24002641	239601-A-04		A
5	24002642	239601-A-05		A
6	24002643	239601-A-06		A
7	24002644	239601-A-07		A
8	24002645	239601-A-08		A
9	24002646	239601-A-09		A
10	24002647	239601-A-10		A
11	24002648	239601-A-11		A
12	24002649	239601-A-12		A
13	24002650	239601-A-13		A
14	24002651	239601-A-14		A
15	24002652	239601-A-15		A

	Print Below	Sign Below	Company	Date	Time
Sampled by	Client				
Relinquished by	DHL				
Received by	Michelle Stratton		NVL-AUR	1/16/04	1:30 PM
Relinquished by					
Analyzed by	Steve Zhang			1/19/04	
Results Called by					
Results Faxed by					

Special Instructions: Unless requested in writing, all samples will be disposed of two (2) weeks after analysis.

NVL Laboratories, Inc.
4708 Aurora Ave N, Seattle, WA 98103
Tel: 206.547.0100 Emerg.Pager: 206.344.1878
Fax: 206.634.1936 1.888.NVL.LABS (685.5227)

CHAIN of CUSTODY SAMPLE LOG

NVL LABS

Client	EKNA Services, Inc.	NVL Batch Number	2400569.00
Address	615 Piikoi Street, Suite 300	Client Job Number	2396-01F
		Total Samples	18
		Rush Samples	
	Honolulu, HI 96814-3139	Turn Around Time 1	2 Days
		Rush TAT	
Project Manager	Mr. Steven Chun	Due Date	1/20/2004
		Time	1:30 PM
Project Location	Corps IDIQ Electrical (DACA83-03-R-0017); Upgrade Electrical System Phase 1, Hickam	Email address	

Phone: (808) 591-8553 Fax: (808) 593-8551

☐ Asbestos Air ☐ PCM (NIOSH 7400) ☐ TEM (NIOSH 7402) ☐ TEM (AHERA) ☐ TEM (EPA Level II) ☐ Other

☒ Asbestos Bulk ☒ PLM (EPA/600/R-93/116) ☐ PLM (EPA Point Count) ☐ PLM (EPA Gravimetry) ☐ TEM BULK

☐ Mold/Fungus ☐ Mold Air ☐ Mold Bulk ☐ Rotometer Calibration

METALS	Det. Limit	Matrix		RCRA Metals	☐ All 8	Other Metals
☐ Total Metals	☐ ppm (AAS)	☐ Air Filter	☐ Paint Chips in cm2	☐ Arsenic (As)	☐ Lead (Pb)	☐ All 3
		☐ Drinking water	☐ Waste Water	☐ Barium (Ba)	☐ Mercury (Hg)	☐ Copper (Cu)
☐ TCLP	☐ ppb (GFAA)	☐ Dust/wipe (Area)	☐ Other	☐ Cadmium (Cd)	☐ Selenium (Se	☐ Nickel (Ni)
		☐ Soil		☐ Chromium (Cr)	☐ Silver (Ag)	☐ Zinc (Zn)
		☐ Paint Chips in %				

☐ Other Types of Analysis ☐ Fiberglass ☐ Silica ☐ Nuisance Dust ☐ Respirable Dust ☐ Other (Specify)

Condition of Package ☒ Good ☐ Damaged (no spillage) ☐ Severe damage (spillage)

	Lab ID	Client Sample Number	Comments (e.g Sample area, Sample Volume, etc)	A/R
16	24002653	239601-A-16		A
17	24002654	239601-A-17		A
18	24002655	239601-A-18		A

	Print Below	Sign Below	Company	Date	Time
Sampled by	Client				
Relinquished by	DHL				
Received by	Michelle Stratton		NVL-AUR	1/16/04	1:30 PM
Relinquished by					
Analyzed by	Steve Zhang			1/19/04	
Results Called by					
Results Faxed by					

Special Instructions: Unless requested in writing, all samples will be disposed of two (2) weeks after analysis.

NVL Laboratories, Inc.
4708 Aurora Ave. N., Seattle, WA 98103
Tel: 206.547.0100, Fax: 206.634.1936
www.nvllabs.com

NVLAP #102063

Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: EKNA Services, Inc.
Address: 615 Piikoi Street, Suite 300
Honolulu, HI 96814 -3139
Attention: Mr. Steven Chun
Project Location: Corps IDIQ Electrical (DACA83-03-R-0017); Upgrade Electrical System Phase 1. Hickam Air Force Base

Batch #: 2400569.00
Client Project #:2396-01F
Samples Received: 18
Samples Analyzed: 18
Method: EPA/600R-93/116

Lab ID : 24002638 Client Sample #: 239601-A-01
Location: Corps IDIQ Electrical (DACA83-03-R-0017); Upgrade Electrical System Phase 1, Hickam Air Force Base

Layer	Description	Non-Fibrous Materials	Other Fibrous Materials:%		Asbestos Type: %	
Layer 1 of 2	Tan vinyl	Vinyl/binder	Cellulose	2%	None Detected	ND
Layer 2 of 2	Gray fibrous backing with mastic	Fine particles,Mastic/binder	Cellulose	5%	None Detected	ND

Lab ID : 24002639 Client Sample #: 239601-A-02
Location: Corps IDIQ Electrical (DACA83-03-R-0017); Upgrade Electrical System Phase 1, Hickam Air Force Base

Layer	Description	Non-Fibrous Materials	Other Fibrous Materials:%		Asbestos Type: %	
Layer 1 of 2	Tan vinyl	Vinyl/binder	Cellulose	2%	None Detected	ND
Layer 2 of 2	Gray fibrous backing with mastic	Fine particles,Mastic/binder	Cellulose	5%	None Detected	ND

Lab ID : 24002640 Client Sample #: 239601-A-03
Location: Corps IDIQ Electrical (DACA83-03-R-0017); Upgrade Electrical System Phase 1, Hickam Air Force Base

Layer	Description	Non-Fibrous Materials	Other Fibrous Materials:%		Asbestos Type: %	
Layer 1 of 3	Tan vinyl	Vinyl/binder	Cellulose	2%	None Detected	ND
Layer 2 of 3	Gray fibrous backing with mastic	Fine particles,Mastic/binder	Cellulose	5%	None Detected	ND
Layer 3 of 3	Brown fibrous material	Fine particles	Cellulose	75%	None Detected	ND

Lab ID : 24002641 Client Sample #: 239601-A-04
Location: Corps IDIQ Electrical (DACA83-03-R-0017); Upgrade Electrical System Phase 1, Hickam Air Force Base

Layer	Description	Non-Fibrous Materials	Other Fibrous Materials:%		Asbestos Type: %	
Layer 1 of 2	Black rubbery material	Rubber/binder	None Detected	ND	None Detected	ND

Sampled by: Client
Analyzed by: Steve Zhang Date: 01/19/2004
Reviewed by: Nick Ly Date: 01/19/2004

Nick Ly, ~~Technical Director~~

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government.

NVL Laboratories, Inc.

4708 Aurora Ave. N., Seattle, WA 98103
Tel: 206.547.0100, Fax: 206.634.1936
www.nvllabs.com

NVLAP #102063

Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: EKNA Services, Inc.
Address: 615 Piikoi Street, Suite 300
Honolulu, HI 96814 -3139
Attention: Mr. Steven Chun
Project Location: Corps IDIQ Electrical (DACA83-03-R-0017); Upgrade Electrical System Phase 1, Hickam Air Force Base

Batch #: 2400569.00
Client Project #:2396-01F
Samples Received: 18
Samples Analyzed: 18
Method: EPA/600R-93/116

Layer 2 of 2 **Description:** Black fibrous material

Non-Fibrous Materials:	Other Fibrous Materials:%	Asbestos Type: %
Fine particles	Cellulose 25%	**None Detected ND**

Lab ID : 24002642 Client Sample #: 239601-A-05
Location: Corps IDIQ Electrical (DACA83-03-R-0017); Upgrade Electrical System Phase 1, Hickam Air Force Base

Layer 1 of 2 **Description:** Black rubbery material

Non-Fibrous Materials:	Other Fibrous Materials:%	Asbestos Type: %
Rubber/binder	None Detected ND	**None Detected ND**

Layer 2 of 2 **Description:** Black fibrous material

Non-Fibrous Materials:	Other Fibrous Materials:%	Asbestos Type: %
Fine particles	Cellulose 25%	**None Detected ND**

Lab ID : 24002643 Client Sample #: 239601-A-06
Location: Corps IDIQ Electrical (DACA83-03-R-0017); Upgrade Electrical System Phase 1, Hickam Air Force Base

Layer 1 of 2 **Description:** Black rubbery material

Non-Fibrous Materials:	Other Fibrous Materials:%	Asbestos Type: %
Rubber/binder	None Detected ND	**None Detected ND**

Layer 2 of 2 **Description:** Black fibrous material

Non-Fibrous Materials:	Other Fibrous Materials:%	Asbestos Type: %
Fine particles	Cellulose 25%	**None Detected ND**

Lab ID : 24002644 Client Sample #: 239601-A-07
Location: Corps IDIQ Electrical (DACA83-03-R-0017); Upgrade Electrical System Phase 1, Hickam Air Force Base

Layer 1 of 1 **Description:** White fibrous/powdery material

Non-Fibrous Materials:	Other Fibrous Materials:%	Asbestos Type: %
Fine particles,Calcareous binder	Cellulose 3%	**Amosite 25%**

Lab ID : 24002645 Client Sample #: 239601-A-08
Location: Corps IDIQ Electrical (DACA83-03-R-0017); Upgrade Electrical System Phase 1, Hickam Air Force Base

Layer 1 of 1 **Description:** White fibrous/powdery material

Non-Fibrous Materials:	Other Fibrous Materials:%	Asbestos Type: %
Fine particles,Calcareous binder	Cellulose 3%	**Amosite 25%**

Lab ID : 24002646 Client Sample #: 239601-A-09
Location: Corps IDIQ Electrical (DACA83-03-R-0017); Upgrade Electrical System Phase 1, Hickam Air Force Base

Sampled by: Client
Analyzed by: Steve Zhang **Date:** 01/19/2004
Reviewed by: Nick Ly **Date:** 01/19/2004

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government.

NVL Laboratories, Inc.
4708 Aurora Ave. N., Seattle, WA 98103
Tel: 206.547.0100, Fax: 206.634.1936
www.nvllabs.com

NVLAP #102063

Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: EKNA Services, Inc.
Address: 615 Piikoi Street, Suite 300
Honolulu, HI 96814 -3139
Attention: Mr. Steven Chun
Project Location: Corps IDIQ Electrical (DACA83-03-R-0017); Upgrade Electrical System Phase 1. Hickam Air Force Base

Batch #: 2400569.00
Client Project #:2396-01F
Samples Received: 18
Samples Analyzed: 18
Method: EPA/600R-93/116

Layer 1 of 1 **Description:** White fibrous/powdery material

Non-Fibrous Materials:	Other Fibrous Materials:%	Asbestos Type: %
Fine particles,Calcareous binder	Cellulose 3%	**Amosite 25%**

Lab ID : 24002647 Client Sample #: 239601-A-10
Location: Corps IDIQ Electrical (DACA83-03-R-0017); Upgrade Electrical System Phase 1, Hickam Air Force Base

Layer 1 of 1 **Description:** Gray cementitious material

Non-Fibrous Materials:	Other Fibrous Materials:%	Asbestos Type: %
Cement/binder	Cellulose 5%	**Chrysotile 30%**

Lab ID : 24002648 Client Sample #: 239601-A-11
Location: Corps IDIQ Electrical (DACA83-03-R-0017); Upgrade Electrical System Phase 1, Hickam Air Force Base

Layer 1 of 1 **Description:** Gray cementitious material

Non-Fibrous Materials:	Other Fibrous Materials:%	Asbestos Type: %
Cement/binder	Cellulose 5%	**Chrysotile 30%**

Lab ID : 24002649 Client Sample #: 239601-A-12
Location: Corps IDIQ Electrical (DACA83-03-R-0017); Upgrade Electrical System Phase 1, Hickam Air Force Base

Layer 1 of 1 **Description:** Gray cementitious material

Non-Fibrous Materials:	Other Fibrous Materials:%	Asbestos Type: %
Cement/binder	Cellulose 5%	**Chrysotile 30%**

Lab ID : 24002650 Client Sample #: 239601-A-13
Location: Corps IDIQ Electrical (DACA83-03-R-0017); Upgrade Electrical System Phase 1, Hickam Air Force Base

Layer 1 of 2 **Description:** Grey tile

Non-Fibrous Materials:	Other Fibrous Materials:%	Asbestos Type: %
Calcareous binder	None Detected ND	**None Detected ND**

Layer 2 of 2 **Description:** Brown mastic

Non-Fibrous Materials:	Other Fibrous Materials:%	Asbestos Type: %
Mastic/binder	Cellulose 2%	**None Detected ND**

Lab ID : 24002651 Client Sample #: 239601-A-14
Location: Corps IDIQ Electrical (DACA83-03-R-0017); Upgrade Electrical System Phase 1, Hickam Air Force Base

Layer 1 of 2 **Description:** Grey tile

Non-Fibrous Materials:	Other Fibrous Materials:%	Asbestos Type: %
Calcareous binder	Cellulose 2%	**None Detected ND**

Sampled by: Client
Analyzed by: Steve Zhang **Date:** 01/19/2004
Reviewed by: Nick Ly **Date:** 01/19/2004

Nick Ly, Technical Director

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NVLAP #102063

Bulk Asbestos Fibers Analysis

By Polarized Light Microscopy

Client: EKNA Services, Inc.
Address: 615 Piikoi Street, Suite 300
Honolulu, HI 96814 -3139
Attention: Mr. Steven Chun
Project Location: Corps IDIQ Electrical (DACA83-03-R-0017); Upgrade Electrical Svstem Phase 1. Hickam Air Force Base

Batch #: 2400569.00
Client Project #:2396-01F
Samples Received: 18
Samples Analyzed: 18
Method: EPA/600R-93/116

Layer 2 of 2 **Description:** Brown mastic

Non-Fibrous Materials:	Other Fibrous Materials:%		Asbestos Type: %	
Mastic/binder	Cellulose	2%	**None Detected**	**ND**

Lab ID : 24002652 **Client Sample #: 239601-A-15**
Location: Corps IDIQ Electrical (DACA83-03-R-0017); Upgrade Electrical System Phase 1, Hickam Air Force Base

Layer 1 of 2 **Description:** Grey tile

Non-Fibrous Materials:	Other Fibrous Materials:%		Asbestos Type: %	
Calcareous binder	None Detected	ND	**None Detected**	**ND**

Layer 2 of 2 **Description:** Brown mastic

Non-Fibrous Materials:	Other Fibrous Materials:%		Asbestos Type: %	
Mastic/binder	Cellulose	2%	**None Detected**	**ND**

Lab ID : 24002653 **Client Sample #: 239601-A-16**
Location: Corps IDIQ Electrical (DACA83-03-R-0017); Upgrade Electrical System Phase 1, Hickam Air Force Base

Layer 1 of 1 **Description:** Black asphaltic fibrous backing with mastic and brittle material

Non-Fibrous Materials:	Other Fibrous Materials:%		Asbestos Type: %	
Asphalt/binder,Mastic/binder,Calcareous binder	Cellulose	45%	**None Detected**	**ND**

Lab ID : 24002654 **Client Sample #: 239601-A-17**
Location: Corps IDIQ Electrical (DACA83-03-R-0017); Upgrade Electrical System Phase 1, Hickam Air Force Base

Layer 1 of 1 **Description:** Black asphaltic fibrous backing with mastic and brittle material

Non-Fibrous Materials:	Other Fibrous Materials:%		Asbestos Type: %	
Asphalt/binder,Mastic/binder	Cellulose	45%	**None Detected**	**ND**

Lab ID : 24002655 **Client Sample #: 239601-A-18**
Location: Corps IDIQ Electrical (DACA83-03-R-0017); Upgrade Electrical System Phase 1, Hickam Air Force Base

Layer 1 of 1 **Description:** Black asphaltic fibrous backing with mastic and brittle material

Non-Fibrous Materials:	Other Fibrous Materials:%		Asbestos Type: %	
Asphalt/binder,Mastic/binder	Cellulose	45%	**None Detected**	**ND**

Sampled by: Client
Analyzed by: Steve Zhang **Date:** 01/19/2004
Reviewed by: Nick Ly **Date:** 01/19/2004

Nick Ly, Technical Director

Note: If samples are not homogeneous, then subsamples of the components were analyzed separately. All bulk samples are analyzed using EPA 600/R-93/116 Method with the following measurement uncertainties for the reported % Asbestos (1%=0-3%, 5%=1-9%, 10%=5-15%, 20%=10-30%, 50%=40-60%). This report relates only to the items tested. If sample was not collected by NVL personnel, then the accuracy of the results is limited by the methodology and acuity of the sample collector. This report shall not be reproduced except in full, without written approval of NVL Laboratories, Inc. It shall not be used to claim product endorsement by NVLAP or any other agency of the US Government.

APPENDIX D

INSPECTOR CERTIFICATES

Edward K. Noda and Associates, Inc.
615 Piikoi Street, Suite 300, Honolulu, Hawaii 96814
(808) 591-8553

This is to Certify that

Steven K. Chun

575-60-7387

Has on August 11, 2003 attended and successfully completed the mandatory refresher course for Asbestos Inspector and has passed an examination in that course with a minimum score of 70%. The person has completed the requisite training course for asbestos accreditation under TSCA Title II, Asbestos Model Accreditation Plan and the provider is accredited to provide training within the State of Hawaii.

Asbestos Inspector
4-Hour Refresher Training

Certificate number: EKNA-ASB-INS-081103-02

Examination Date: August 11, 2003

Expiration Date: August 11, 2004

William C. Harris, Principal Instructor

United States Environmental Protection Agency

This is to certify that

Steven K. Chun

has fulfilled the requirements of the Toxic Substances Control Act (TSCA) Section 402(a)(1), and has received certification to conduct lead-based paint activities pursuant to 40 CFR Part 745.226 as a Inspector.

In the State of:

HAWAII

This certification is valid for three (3) years from the date of issuance and expires 3/19/04.

HI-03-0320044263
Certification #

March 19, 2001
Issued on

Approving Official

Senior Associate, Cross-Media Division
Title

United States Environmental Protection Agency

This is to certify that:

Steven K Chun

has fulfilled the requirements of the Toxic Substance Control Act (TSCA) Section 402(a)(1), and has received certification as an individual, pursuant to 40 CFR Part 745.226 to conduct lead-based paint activities for the following:

Discipline: Risk Assessor

Jurisdiction: State of Hawaii excluding Indian Tribes

This certification is valid from the date of issuance and expires February 23, 2006

Certification # HI-09-022006-186 Issued on: February 24, 2003

Paula Besson

for Enrique Manzanilla, Division Director, CMD
Cross Media Division

ATTACHMENT #4

ENVIRONMENTAL SUBSURFACE REPORT

LIMITED SUBSURFACE INVESTIGATION
UPGRADE ELECTRICAL SYSTEM, PHASE 1
HICKAM AIR FORCE BASE, OAHU, HAWAII

Prepared For:

MK Engineers
286 Kalihi Street
Honolulu, Hawaii 96819

Prepared By:

Edward K. Noda and Associates, Inc.
615 Piikoi Street Suite 300
Honolulu, Hawaii 96814-3139

Project No. 2396 - 01F
January 28, 2004

LIMITED SUBSURFACE INVESTIGATION
UPGRADE ELECTRICAL SYSTEM, PHASE 1
HICKAM AIR FORCE BASE, OAHU, HAWAII

Prepared For:

MK Engineers
286 Kalihi Street
Honolulu, Hawaii 96819

Prepared By:

Edward K. Noda and Associates, Inc.
615 Piikoi Street Suite 300
Honolulu, Hawaii 96814-3139

Project No. 2396 - 01F
January 28, 2004

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LIMITED SUBSURFACE INVESTIGATION
UPGRADE ELECTRICAL SYSTEM, PHASE 1
HICKAM AIR FORCE BASE, OAHU, HAWAII

Executive Summary

This report details the activities undertaken and information obtained during a Limited Subsurface Investigation (LSI) along the proposed alignment of Phase 1 of the proposed electric system for Hickam Air Force Base on the island of Oahu, Hawaii. This investigation was conducted to provide information for the design and construction of the subject project.

This investigation was a limited investigation with field exploration conducted in conjunction with the geotechnical engineering exploration for the project. The field exploration consisted of the drilling and sampling of 10 relatively shallow test borings at selected locations along the project alignment. Samples collected were analyzed for petroleum, petroleum constituents, volatile organics, selected metals and PCBs.

Laboratory analyses did not indicate the presence of any of the target analytes in concentrations exceeding Hawaii Department of Health action levels. In general, material excavated during installation of the electrical ducts may be disposed of as general fill material. Use as fill material at residential sites is not recommended unless further testing is conducted during construction to verify that the material does not exceed re-use standards for residential locations.

It should be noted that evidence of subsurface contamination was observed in some areas along and adjacent to the proposed alignment. Although no contamination was found in the exploration, there is a potential that dewatering operations could cause contamination to migrate from these adjacent sites to the work area. It is recommended that a monitoring program be implemented during construction to further evaluate this issue.

LIMITED SUBSURFACE INVESTIGATION
UPGRADE ELECTRICAL SYSTEM, PHASE 1
HICKAM AIR FORCE BASE, OAHU, HAWAII

1.0 Introduction

This report details the activities undertaken and information obtained during a Limited Subsurface Investigation (LSI) along the proposed alignment of Phase 1 of the proposed electric system for Hickam Air Force Base on the island of Oahu, Hawaii. This investigation was conducted to provide information for the design and construction of the subject project.

This investigation was a limited investigation with field exploration conducted in conjunction with the geotechnical engineering exploration for the project. The field exploration consisted of the drilling and sampling of 10 relatively shallow test borings at selected locations along the project alignment. Samples collected were analyzed for petroleum, petroleum constituents, volatile organics, selected metals and PCBs.

1.1 Project Personnel

The following personnel were involved in the implementation of this Investigation:

Consultant	Edward K. Noda and Associates, Inc. 615 Piikoi Street, Suite 300 Honolulu, Hawaii 96814 Telephone: (808) 591-8553 Facsimile: (808) 593-8551
Principal-In-Charge	Ms. Elaine E. Tamaye Telephone: (808) 591-8553, Ext. 204
Project Manager	Mr. Charles G. Schuster, PE Telephone: (808) 591-8553, Ext. 207
Geologist	Mr. Dayton E. Fraim, PG, PE Telephone: (808) 591-8553, Ext. 209
Analytical Laboratory	Oceanic Analytical Laboratory POC: Dr. Ken Lee, Ph.D. Telephone: (808) 487-5227

2.0 General Site Characteristics

2.1 Site Location

The project site is situated on Hickam Air Force Base on the island of Oahu, Hawaii. The proposed duct alignment runs through the northeast portion of Hickam Air Force Base, as shown on Figure 1, for a total distance of approximately 7,200 feet.

2.2 Adjacent Properties and Vicinity

Land use east of the alignment has been for aircraft hardstands and hangars, including servicing and repair, while to the west the primary uses are administrative in nature. The northernmost end of the alignment is in family housing and traverses through a recreational area to the base exchange complex.

Prior use of the new substation site generally consisted of small outbuildings related to aircraft operations. The buildings have been demolished and only the concrete floor slabs remain. Two aircraft wash racks are sited on the northeast side of the site, while a vehicle storage site is located to the southwest.

During the course of the field investigation, it was noted that there was evidence of previous releases or contamination along the alignment or close to it. Sites specifically observed were:

- A product or vapor recovery system immediately adjacent to boring N9. This system appears to be related to other similar systems in the parking area between the Burger King restaurant and the base exchange.
- A series of ground water monitoring wells in the lawn area fronting Building 2050. During the investigation, it was noted that another consultant was in the process of sampling those wells. A discussion with those personnel indicated that there had been a small tank farm at that site.
- There was a ground water monitoring well near boring N10.

3.0 Environmental Setting

3.1 Regional Physiographic Conditions

The ground surface elevation of the Site ranges from about 5 feet above mean sea level to a maximum of about 25 feet above mean sea level. The topography in the area of the Site is generally level with a gentle slope down towards the south.

According to the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM), the Site is located in an area where flood hazards are undetermined (Zone D)." Precipitation falling on the Site is intercepted by the base storm drain system.

3.2 Soil Conditions

The surface soils in the area of the Site have been mapped by the US Department of Agriculture Soil Conservation Service as Mamala series (MnB and MnC) and as Filled Land (FL). The Mamala soils are well drained and are generally shallow, averaging about 20 - 30 inches, overlying coral limestone. Filled Land is characterized as man-made fills placed in low marshy areas.

In most of the borings drilled for this investigation, the shallow surface soils consisted of man-made fill. Most of the borings encountered volcanic tuff under the surface fill. In the southern portion of the alignment, the borings frequently encountered coral formation under the fill.

3.3 Regional Geology

The island of Oahu is composed largely of the weathered remnants of two extinct shield volcanoes - Waianae and Koolau. Koolau is the younger of the two and forms the eastern two-thirds of the island. After the cessation of the main shield building phase of Koolau, erosion deposited alluvial materials on the lower flanks of the volcano.

The assessed Site is located on the southern flank of Koolau and its geomorphology and subsurface conditions are directly related to glacio-eustatic fluctuations of sea level during the Pleistocene and the genesis of the Honolulu Coastal Plain. The base of the stratigraphic section in this area is Koolau Basalt.

During the Pleistocene (Ice Age), there were many sea level changes as a result of widespread glaciation in the continental areas of the world. The higher sea level stands caused the accumulation of sediments in the heads of the old bays, accumulation of reef deposits at corresponding higher elevations and lagoonal/marine sediments in the quiet waters protected by fringing reefs. The lower sea stands caused streams to carve valleys in the sediments and reef deposits. Renewed erosion deposited alluvial soils in the lagoons and bays.

Renewed vulcanism during the Pleistocene resulted in the deposition of volcanic materials in various portions of the island of Oahu. Eruption of the Salt Lake and Aliamanu vents to the north of Hickam Air Force Base laid tuff deposits over portions of the area.

During the 19th and early 20th centuries, much of the Hickam area was marshy lowlands. During development of the area for military and airport operations, the low marshy areas were filled with man-made fills of various origin.

3.4 Ground Water Conditions

Since the site is downgradient (makai) of the UIC Line, it is considered, by default, to overlie ground water that is not a source or potential source of drinking water. The ground water underlying the site has been evaluated in accordance with guidelines presented in DOH's policy statement entitled "Determination of Ground Water Utility at Leaking Underground Storage Tanks", dated September 19, 1995 using the University of Hawaii Water Resources Research Center's Technical Report #179 (Mink and Lau, 1990).

This evaluation indicates that the shallow ground water underlying the site is not a potential source of drinking water nor is it ecologically important.

TABLE 1: AQUIFER CLASSIFICATION SYSTEM		
Aquifer	**Caprock Aquifer**	**Basalt Aquifer**
Aquifer Code	**30104116**	**30104121**
Island Code	3 - Oahu	3 - Oahu
Aquifer Sector	01 - Honolulu	01 - Honolulu
Aquifer System	04 - Moanalua	04 - Moanalua
Aquifer Type, hydrogeology	1 - Basal	1 - Basal
Aquifer Condition	1 - Unconfined	2 - Confined
Aquifer Type, geology	6 - Sedimentary	1 - Flank
Status Code	**23321**	**11113**
Development Stage	2 - Potential Use	1 - Currently Used
Utility	3 - Neither Drinking nor Ecologically Important	1 - Drinking
Salinity (in mg/L Cl^-)	3 - Moderate (1,000 - 5,000)	1 - Fresh (<250)
Uniqueness	2 - Replaceable	1 - Irreplaceable
Vulnerability to Contamination	1 - High	3 - Low

4.0 General Site Investigation Procedures

To aid in establishing a reasonable standard of care in work, EKNA used standards promulgated by the American Society of Testing and Materials (ASTM) as guidance in conducting field work. The following standards were used:

- ASTM D 1586-84 *Penetration Test and Split-Barrel Sampling of Soils*
  This ASTM standard was incorporated to provide guidance in the application of split-barrel samplers and for reference in the event that standard penetration test sampling is used during the course of the work.

- ASTM D 2488-93 *Description and Identification of Soils (Visual-Manual Procedure)*
  EKNA personnel involved in the field sampling work are familiar with description of soils by the Unified Soil Classification System (USCS). This standard was incorporated to provide guidance for field procedures that may be used to develop USCS descriptions of soil in lieu of the rigorous physical laboratory testing required in the USCS (ASTM D 2487).

- ASTM D 3550-84 *Ring-Lined Barrel Sampling of Soils*
  This ASTM standard was incorporated to provide general guidance in the application of lined samplers and to address the samples obtained from the direct push borings since the direct push samplers were lined with sample tubes.

- ASTM D 4547-91 *Sampling Waste and Soils for Volatile Organics*
  This standard was incorporated to provide guidance for field procedures that were used for the collection of samples under this project.

- ASTM D 4840-88 *Sampling Chain of Custody Procedures*
  Chain of Custody procedures are considered to be an industry standard. This standard was incorporated to provide guidance for procedures that were used under this project.

- ASTM D 5434-93 *Field Logging of Subsurface Explorations of Soil and Rock*
  This standard was incorporated to provide guidance for procedures that were used under this project.

The borings were drilled using solid stem augers. Drive samples were collected using a 3-inch OD Modified California Sampler with stainless steel liners.

The materials encountered in the sampling work were examined and classified in general accordance with ASTM Standard Practice D 2488-84, *Description and Identification of Soils (Visual-Manual Procedure)*.

The ends of the sample tubes were covered with PTFE (Teflon™) sheeting and capped to prevent loss of sample and to minimize the potential of loss of volatile substances, if present, from the soil matrix. The tubes were labelled and placed in a Zip-Loc™ or Whirl-Pak™ bag to:

1. If the sample consisted of more than one tube, keep the tubes for the individual sample together and thereby minimize the potential that one of the tubes might be misplaced.

2. Aid in protecting the sample from contamination by excess moisture or possible cross-contamination between samples.

3. To minimize the potential of samples contaminating ancillary sample management equipment such as coolers or reusable ice substitute packs.

Samples were then placed in coolers with reusable ice substitute packs or wet ice (double bagged to keep melt water from coming in contact with the samples) to preserve the samples. Coolers were lined with plastic to minimize the potential of contamination of the coolers by substances which may be present on the samples. An absorbent material, such as plain white paper towels or sorbent pads, was placed on the bottom of the cooler to absorb condensate.

4.1 Sample Handling

Samples were collected under a strict Chain of Custody (COC) protocol. Sample collection was in accordance with the following protocol:

- Samples were collected from selected depths in the borings using a 3-inch OD California split barrel sampler with stainless steel liners.

- Collected samples were logged onto the COC forms providing the following information:

  - date of sample location,
  - time of sample collection,
  - test method for analyses; and,
  - sampler's name.

- As described in the ASTM procedures, completed sample labels were affixed to the sample containers, i.e. liners, and each sample was labeled with a unique number and other information required on the label.

- Chain of Custody (COC) was maintained for all samples.

- After collection, each of the samples placed in bags sealed to prevent leakage. Samples were kept cool and stored over ice substitute in coolers for transport to the fixed laboratories for analyses.

- All samples were submitted to the local laboratory representative within 24 hours of collection.

5.0 Quality Assurance

5.1 Data Quality Objectives

The area in the vicinity of the project site was believed to have possibly been impacted by contaminants related to the military and industrial use of areas along the proposed alignment. The information that was required of this current investigation was screening for petroleum in several ranges, petroleum constituents, total metals, solvents and PCBs at the Site.

5.2 Quality Control

Field Quality Assurance and Quality Control (QA/QC) procedures, such as replicate samples, were not used for this investigation. However, all data was reviewed to assure representativeness of the sampling and analyses.\

5.3 Data Review

Chemical data on the soils at the project Site were developed from the analyses of the samples. All chemical data were reviewed to determine that QA/QC objectives have been met and that the data are representative.

5.3.1 Holding Time

When a sample is collected and removed from its natural environment, chemical conditions within the sample matrix begin to change, or degrade. All target analytes and analytical methods have been assigned holding times which are considered to be the maximum length of time, after sample collection, that a sample may be held and still be considered to be representative of the chemical conditions in the matrix sampled at the location sampled and at the time sampled.

Initial data review for all chemical data on EKNA projects includes a check to verify that the samples were analyzed within the holding time allotted to the target analyte and method. For this project, all samples were analyzed on an expedited basis so holding times were not considered an issue.

5.3.2 Data Assessment

Data review for this project generally indicated that the data were valid and complete.

5.3.3 Laboratory Quality Control Procedures

Laboratory services for this project were provided by Oceanic Analytical Laboratory (OAL) in Aiea, Hawaii. OAL holds numerous validations from various agencies, such as the US Air Force and Hawaii Department of Health. As a validated laboratory, OAL is familiar with quality control procedures.

5.3.4 Corrective Actions

Corrective actions are initiated whenever the data quality indicators, e.g., holding times, laboratory control samples, blanks, spikes, etc., suggest that data quality may be suspect. Corrective actions begin with identification of the problem. Potential sources of problems include non-conformance to methods and procedures, improper data reduction, equipment malfunctions, or contamination from external sources. For this project, there were no outstanding issues identified in the analyses of the soil samples.

6.0 Laboratory Analysis

As previously discussed, soils and materials near or adjacent to the Site were believed to potentially be impacted by military and industrial operations. Samples were analyzed for the following parameters:

- Total Petroleum Hydrocarbons as Gasoline, Diesel, Motor Oil and Jet Fuel
- Benzene, Toluene, Ethylbenzene and Xylenes
- Volatile Organic Compounds
- Polynuclear Aromatic Hydrocarbons (Benzo(a)pyrene, Acenaphthene, Naphthalene and Flouranthene)
- Total Arsenic, Cadmium, Chromium and Lead
- TCLP - RCRA 8 Priority Metals
- Polychlorinated Biphenyls (PCBs)

All samples submitted to the laboratory were extracted and analyzed within the appropriate holding times. The results of all of the laboratory testing are compared to the DOH action levels in Table 2 -Summary of Laboratory Analysis Results.

6.1 Total Petroleum Hydrocarbons

Total Petroleum Hydrocarbons were detected as Gasoline in sample nos. N8-10.0 at 1.41 milligrams per kilogram (mg/kg) and N4-8.0 at 49.4 mg/kg. They were detected as Unidentified Hydrocarbons in the motor oil range in sample no. N1-2.0 (101 mg/kg), N1-5.0 (51.3 mg/kg) and N2-2.0 (20.6 mg/kg). There were no other detections of petroleum hydrocarbons in any of the samples analyzed.

6.2 Benzene, Toluene, Ethylbenzene and Xylenes

Benzene was detected only in sample no. N8-3.0 (0.0191 mg/kg). Ethylbenzene and o-Xylene were detected only in sample no. N4-8.0 at concentrations of 0.157 mg/kg and 0.0232 mg/kg, respectively. There were no other detections in any of the other samples analyzed.

6.3 Volatile Organic Compounds

Of all the volatile organic compounds, only Acetone was detected in sample no. N8-3.0 at a concentration of 0.169 mg/kg. None of the other samples had reported concentrations above method reporting limits.

6.4 Polynuclear Aromatic Hydrocarbons (Benzo(a)pyrene, Acenaphthene, Naphthalene and Fluoranthene)

For the suite of Polynuclear Aromatic Hydrocarbons, only Benzo(a)pyrene and Fluoranthene were detected in any of the samples analyzed. These two analytes were found only in sample no. N1-2.0 at a concentration of 0.0473 mg/kg for Benzo(a)pyrene and 0.0360 mg/kg for Fluoranthene.

6.5 Total Metals

Soil samples collected for this investigation were analyzed for Total Arsenic, Cadmium, Chromium and Lead using Method SW6010B.

Arsenic was detected in several soil samples at concentrations ranging between 5.30 and 20.0mg/kg. The Hawaii DOH has no standard for arsenic in soils. The USEPA Preliminary Remediation Goal (PRG) for total chromium in residential soils is 22 mg/kg. No samples exceeded the PRG.

Cadmium was not detected in any soil samples at concentrations greater than the method reporting limit.

Chromium was detected in the soil samples at concentrations ranging from 10.7 mg/kg to 212 mg/kg in soils collected at the Site. The Hawaii DOH has no standard for chromium in soils. The USEPA Preliminary Remediation Goal (PRG) for total chromium in residential soils is 210 mg/kg. Only sample N10-1.0 exceeded the PRG.

Lead was detected in only in soil sample no. N1-2.0 at a concentration of 180 mg/kg. This single detection does not exceed the DOH action level of 400 mg/kg for lead. None of the other soil samples analyzed exceeded method reporting limit levels for total lead.

6.6 TCLP Metals

To determine whether metals in the soils at the Site would exceed leachability standards for municipal landfill disposal, samples were tested using the Toxicity Characteristic Leaching Procedure (TCLP). With the exception of a single detection of leached barium at 3.40 milligrams per liter (mg/l) in sample no. N8-3.0, none of the other samples yielded detectable concentrations of leached metals. The regulatory for TCLP barium is 100 mg/l.

6.7 Polychlorinated Biphenyls (PCB)

Polychlorinated Biphenyls (PCBs) were analyzed for all seven congeners using Method SW8082. No soil samples indicated the presence of PCBs in concentrations exceeding the method reporting limit.

Table 5 - Summary of Laboratory Analysis Results

SAMPLE ID# / Analyte & EPA Method No.	N9-3.0	N9-10.0	N8-3.0	N8-10.0	N7-2.0	N7-10.0	N6-3.0	N6-10.0	N5-3.0	N5-6.0	HI-ALSG or EPA PRG
TPH - Gasoline	ND	ND	ND	1.41	ND	ND	ND	ND	ND	ND	2,000
TPH - Diesel Fuel	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	5,000
TPH - Motor Oil	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	5,000
TPH - Jet Fuel	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	5,000
Benzene	ND	ND	0.0191	ND	ND	ND	ND	ND	ND	ND	1.7
Toluene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	34
Ethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.5
Xylenes	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	23
Benzo(a)pyrene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.0
Acenaphthene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	18
Naphthalene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	41
Fluoranthene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	11
Volatile Organics	ND	ND	0.169 Acetone	ND	ND	ND	ND	ND	ND	ND	Varies
PCBs	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.0
Arsenic	ND	ND	ND	ND	ND	ND	ND	6.62	ND	5.55	22
Cadmium	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	38
Chromium	48.0	77.1	160	77.6	149	60.2	ND	135	16.8	21.5	210
Lead	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	400
TCLP Metals	ND	ND	3.40 Barium	ND	ND	ND	ND	ND	ND	ND	Varies

Notes Tier I ALSG = Hawaii Department of Health's Tier I Action Levels for Soil and Ground Water assuming <200 cm/year rainfall, drinking water source not threatened.

All samples are reported as parts per million (ppm or mg/kg) unless otherwise noted. TCLP is in mg/l.

Hits above the DOH-ALSG are typed in BOLD lettering, if detected. NA indicates not analyzed. NS indicates no standard in ALSG. ND indicates that all analytes within that suite were less than MRL.

Table 5 - Summary of Laboratory Analysis Results

SAMPLE ID# / Analyte & EPA Method No.	N4-3.0	N4-8.0	N3-3.0	N3-5.0	N1-2.0	N1-5.0	N2-2.0	N2-5.0	N10-1.0	N10-3.0	HI-ALSG or EPA PRG
TPH - Gasoline	ND	49.4	ND	1.41	ND	ND	ND	ND	ND	ND	2,000
TPH - Diesel Fuel	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	5,000
TPH - Motor Oil	ND	ND	ND	ND	101	51.3	20.6	ND	ND	ND	5,000
TPH - Jet Fuel	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	5,000
Benzene	ND	ND	0.0191	ND	ND	ND	ND	ND	ND	ND	1.7
Toluene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	34
Ethylbenzene	ND	0.157	ND	ND	ND	ND	ND	ND	ND	ND	0.5
Xylenes	ND	0.0232	ND	ND	ND	ND	ND	ND	ND	ND	23
Benzo(a)pyrene	ND	ND	ND	ND	0.0473	ND	ND	ND	ND	ND	1.0
Acenaphthene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	18
Naphthalene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	41
Fluoranthene	ND	ND	ND	ND	0.0360	ND	ND	ND	ND	ND	11
Volatile Organics	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	Varies
PCBs	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.0
Arsenic	ND	ND	ND	ND	20.0	ND	5.30	6.62	ND	ND	22
Cadmium	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	38
Chromium	10.7	65.3	12.5	23.1	106	14.6	18.5	12.5	212	81.5	210
Lead	ND	ND	ND	ND	180	ND	ND	ND	ND	ND	400
TCLP Metals	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	Varies

Notes Tier I ALSG = Hawaii Department of Health's Tier I Action Levels for Soil and Ground Water assuming <200 cm/year rainfall, drinking water source not threatened.

All samples are reported as parts per million (ppm or mg/kg) unless otherwise noted. TCLP is in mg/l.

Hits above the DOH-ALSG are typed in BOLD lettering, if detected. NA indicates not analyzed. NS indicates no standard in ALSG. ND indicates that all analytes within that suite were less than MRL.

7.0 Discussion and Conclusions

Laboratory analyses did not indicate the presence of any of the target analytes in concentrations exceeding Hawaii Department of Health action levels. In general, material excavated during installation of the electrical ducts may be disposed of as general fill material. Use as fill material at residential sites is not recommended unless further testing is conducted during construction to verify that the material does not exceed re-use standards for residential locations.

It should be noted that evidence of subsurface contamination was observed in some areas along and adjacent to the proposed alignment. Although no contamination was found in the exploration, there is a potential that dewatering operations could cause contamination to migrate from these adjacent sites to the work area. It is recommended that a monitoring program be implemented during construction to further evaluate this issue.

8.0 Limitations and Conditions

Although this report provides information on the relative presence or absence of selected contaminants at the site, it should not be construed as a final statement that the subject property is completely free of environmental contaminants other than described herein.

This investigation was performed with the objective of developing information and recommendations about the Site. EKNA does not assign any design or environmental recommendations or observations other than stated herein.

The information set forth is based solely on the agreed upon scope of services. This information is based on personal observation, researching of existing geologic and hydrologic conditions, and data provided by others. Design feasibility, the presence of other subsurface contamination, radioactive materials and biological hazards were not specifically investigated in this report.

Given the often obscure and elusive nature of hazardous substances, possible differing site conditions and subsurface geology, it is never possible to absolutely dismiss the possibility of site variances, even with exhaustive investigation. Edward K. Noda and Associates, Inc. expressly disclaim any and all liability representations, expressed, or implied, contained in, or for omissions from this report, or any other written or oral communication which might be interpreted as establishing the total extent of all liability present at the subject properties. No other warranty or representation, either expressed or implied, is included or intended. Our services have been performed with the usual thoroughness and competence of the consulting profession, in accordance with the standards for professional services at this time.

DAYTON E. FRAIM
LICENSED PROFESSIONAL ENGINEER
No. 7572-C
HAWAII, U.S.A.

PROFESSIONAL GEOLOGIST
DAYTON EARL FRAIM
PG-2990
WYOMING

Sincerely Yours,
Edward K. Noda and Associates

Dayton E. Fraim, PG, PE
Senior Engineering Geologist

CHARLES G. SCHUSTER
LICENSED PROFESSIONAL ENGINEER
No. 5634-C
HAWAII, U.S.A.

Charles G. Schuster

Charles G. Schuster, PE
Project Manager

REFERENCES

Published References

Macdonald, Gordon A., Abbot, Agatin T., and Peterson, Frank L., "Volcanoes in the Sea - The Geology of Hawaii", University of Hawaii Press, 1983, Honolulu.

Mink, John F. and Lau, Stephen L., "Aquifer Identification and Classification for O'ahu: Ground Water Protection Strategy for Hawai'i, Technical Report No. 179" February 1990, Water Resources Research Center, University of Hawaii at Manoa, Honolulu.

Foote, Donald E., Hill, Elmer L., Nakamura, Sakuichi, and Stephens, Floyd, "Soil Survey of the Islands of Kauai, Oahu, Maui, Molokai and Lanai, State of Hawaii," 1971, United States Department of Agriculture, Soil Conservation Service, In Cooperation with the University of Hawaii Agricultural Experiment Station.

ASTM D 1586-84, "Penetration Test and Split-Barrel Sampling of Soils"

ASTM D 2488-93, "Description and Identification of Soils (Visual-Manual Procedure)"

ASTM D 3550-84, "Ring-Lined Barrel Sampling of Soils"

ASTM D 4547-91, "Sampling Waste and Soils for Volatile Organics"

ASTM D 4840-88, "Sampling Chain of Custody Procedures"

ASTM D 5434-93, "Field Logging of Subsurface Explorations of Soil and Rock"

Maps and Other Geographical References

U.S. Geological Survey, "Pearl Harbor" Quadrangle, 7.5 Minute Series, Topographic Maps, 1983.

Department of Health, State of Hawaii, Underground Injection Control Map, "Pearl Harbor" (0-16), 1983.

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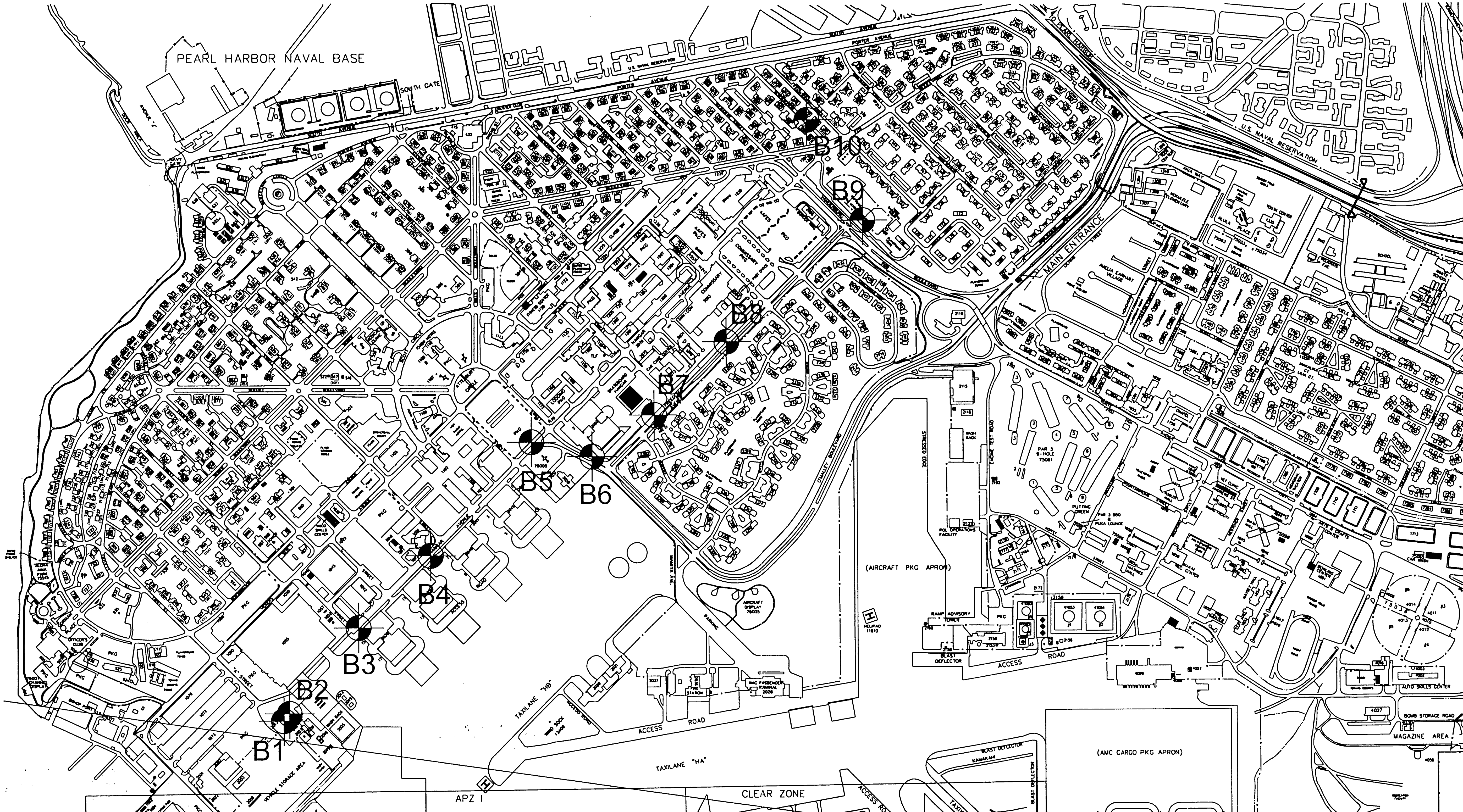


LEGEND:

Boring Number and Approximate Location

GRAPHIC SCALE:
0 500 1,000 2,000 FT.
1" = 1,000'

Edward K. Noda and Associates, Inc. 615 PIIKOI STREET SUITE 300, HONOLULU, HAWAII, 96814	Reference: W.O. 03-3831 Ernest K. Hirata & Associates, Inc.	Upgrade Hickam Electrical Distribution System, Phase I BORING LOCATION PLAN	DRAWN BY: C.P. DATE: JANUARY 2004 PROJECT #: 2396-01F	FIGURE 1

Appendix A

Log of Borings

DRILL HOLE LOG

DRILL HOLE NO: **N-1**

PROJECT: **Upgrade Electrical, Phase 1, Hickam**
CLIENT/OWNER: **MK Engineers**
DRILLER: **E.K Hirata and Associates, Inc**
DRILL RIG: **CME-55** HOLE DIAMETER: **4 inch**
DEPTH TO WATER: **5.1**

PROJECT NO: **2396-01F**
DATE: **11/12/2003**
TOC ELEV:
GS ELEV:
LOGGED BY: **D. Fraim**

DEPTH	WELL DETAILS	SOIL SYMBOLS, SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Sample Number	Description	PID (PPM)	Date Time	Recovery
0					Concrete Slab - 6 inches thick			
			GW		Tan to white Sandy GRAVEL, dense, damp (FILL)			
		13/4/5	MH-SM	2.0	Light reddish brown Sandy SILT, moist to wet, soft to medium stiff (FILL?)	0.1	11/12/2003 08:35	
5		6/5/1	GW	5.0	Tan to light brown Sandy GRAVEL with some Silt, loose to very loose, wet to saturated (REEF DETRITIUS)	0.1	11/12/2003 08:44	
10								
15								
20								

Boring terminated at 6.5 feet - 0855 hours - 12 NOV 03
Ground water at 5.1 feet - 0845 hours
Backfilled and patched by drillers

Edward K. Noda and Associates, Inc.

FIGURE A-1

DRILL HOLE LOG

DRILL HOLE NO: **N-2**

PROJECT: **Upgrade Electrical, Phase 1, Hickam**
PROJECT NO: **2396-01F**
CLIENT/OWNER: **MK Engineers**
DATE: **11/12/2003**
DRILLER: **E.K Hirata and Associates, Inc**
TOC ELEV:
DRILL RIG: **CME-55**
HOLE DIAMETER: **4 inch**
GS ELEV:
DEPTH TO WATER: **4.5**
LOGGED BY: **D. Fraim**

DEPTH	WELL DETAILS	SOIL SYMBOLS, SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Sample Number	Description	PID (PPM)	Date Time	Recovery
0					Asphalt Pavement Section: 2" AC, 6" Coral base course			
			GW		Tan Sandy GRAVEL with trace of Silt, dense, damp (FILL)			
		30/50 for 0.1'	MH-SM	2.0	Light brown Sandy SILT with Gravel, stiff, moist (FILL?)	0.1	11/12/2003 09:20	
5		13/12/12	GW	5.0	Tan Sandy GRAVEL, medium dense, wet to saturated (REEF DETRITUS)	0.1	11/12/2003 09:25	
					Boring terminated at 6.5 feet - 0945 hours - 12 NOV 03 Ground water at 4.5 feet - 0923 hours Boring backfilled and patched by drillers			
10								
15								
20								

Edward K. Noda and Associates, Inc.

FIGURE A-2

DRILL HOLE LOG

DRILL HOLE NO: **N-3**

PROJECT: **Upgrade Electrical, Phase 1, Hickam**
CLIENT/OWNER: **MK Engineers**
DRILLER: **E.K Hirata and Associates, Inc**
DRILL RIG: **CME-55** HOLE DIAMETER: **4 inch**
DEPTH TO WATER: **6**

PROJECT NO: **2396-01F**
DATE: **11/11/2003**
TOC ELEV:
GS ELEV:
LOGGED BY: **D. Fraim**

DEPTH	WELL DETAILS	SOIL SYMBOLS, SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Sample Number	Description	PID (PPM)	Date Time	Recovery
0					Asphalt Pavement Section: 2" AC, 5" Basalt Base Course			
			MH-SM		Brown Sandy SILT with Gravel, stiff, moist (FILL)			
		6/8/6	SW	3.0	Tan Gravelly SAND with trace of Silt, medium dense, damp (FILL)		11/11/2003 15:45	
5		4/3/5	GW	5.0	Tan to white Sandy GRAVEL with trace of Silt, loose, wet (REEF DETRITUS)		11/11/2003 15:52	
					Boring terminated at 6.5 feet - 1610 hours Ground water at 6.0 feet - 1555 hours Boring backfilled and patched by drillers			
10								
15								
20								

Edward K. Noda and Associates, Inc.

FIGURE A-3

DRILL HOLE LOG

DRILL HOLE NO: **N-4**

PROJECT: **Upgrade Electrical, Phase 1, Hickam** PROJECT NO: **2396-01F**
CLIENT/OWNER: **MK Engineers** DATE: **11/11/2003**
DRILLER: **E.K Hirata and Associates, Inc** TOC ELEV:
DRILL RIG: **CME-55** HOLE DIAMETER: **4 inch** GS ELEV:
DEPTH TO WATER: **6.5** LOGGED BY: **D. Fraim**

DEPTH	WELL DETAILS	SOIL SYMBOLS, SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Sample Number	Description	PID (PPM)	Date Time	Recovery
0					Asphalt Pavement Section: 2" Asphaltic Concrete, 6" Basalt Base Course			
			GW	3.0	Light brown Sandy GRAVEL with Silt, medium dense, moist (FILL)		11/11/2003 15:03	
5		7/11/8	ML/SM		Light brown Sandy SILT with Gravel, medium stiff, wet (FILL?)			
		50 for 0.2'		8.0	Dark brownish gray VOLCANIC TUFF, strong (HONOLULU VOLCANIC SERIES) - weak Jet Fuel odor noted in sample		11/11/2003 15:10	
10					Boring terminated at 8.2 feet - 1530 hours -11 NOV 03 Ground water at 6.5 feet - 1520 hours Boring backfilled and patched by drillers			
15								
20								

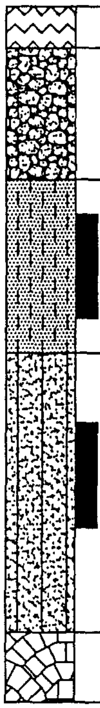
Edward K. Noda and Associates, Inc.

FIGURE A-4

DRILL HOLE LOG

DRILL HOLE NO: **N-5**

PROJECT: **Upgrade Electrical, Phase 1, Hickam** | PROJECT NO: **2396-01F**
CLIENT/OWNER: **MK Engineers** | DATE: **11/11/2003**
DRILLER: **E.K Hirata and Associates, Inc** | TOC ELEV:
DRILL RIG: **CME-55** | HOLE DIAMETER: **4 inch** | GS ELEV:
DEPTH TO WATER: **7.65** | LOGGED BY: **D. Fraim**



DEPTH	WELL DETAILS	SOIL SYMBOLS, SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Sample Number	Description	PID (PPM)	Date Time	Recovery
0					AC Pavement Section: 2" Asphaltic Concrete, 6" Basalt Base Course			
			GW		Tan to white Sandy GRAVEL with Silt, dense, damp (FILL)			
		5/5/5	SM/SP	3.0	Light brown Silty SAND with Gravel, loose, moist (FILL?)		11/11/2003 14:04	
5		5/6/4	ML/SM	6.0	Light brown Sandy SILT with Gravel, *medium stiff, wet to saturated* (LAGOONAL DEPOSIT)		11/11/2003 14:12	
					Coral-algal LIMESTONE, *moderately* strong (REEF FORMATION)			
10					Boring terminated at 10.0 feet - 1430 hours -11 NOV 03 Ground water at 7.65 feet - 1420 hours *Boring backfilled and patched by drillers*			
15								
20								

Edward K. Noda and Associates, Inc.

FIGURE A-5

DRILL HOLE LOG

DRILL HOLE NO: **N-6**

PROJECT: **Upgrade Electrical, Phase 1, Hickam** PROJECT NO: **2396-01F**
CLIENT/OWNER: **MK Engineers** DATE: **11/11/2003**
DRILLER: **E.K Hirata and Associates, Inc** TOC ELEV:
DRILL RIG: **CME-55** HOLE DIAMETER: **4 inch** GS ELEV:
DEPTH TO WATER: LOGGED BY: **D. Fraim**

DEPTH	WELL DETAILS	SOIL SYMBOLS, SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Sample Number	Description	PID (PPM)	Date Time	Recovery
0					AC Pavement Section: 3" Asphaltic Concrete, 6" Basalt Base Course			
			GW		Tan to white Sandy GRAVEL with Silt, dense, damp (FILL)			
		24/14/23		3.0			11/11/2003 12:57	
5			MH		Light brown Clayey SILT, medium stiff to stiff, plastic, very moist (ALLUVIUM?)			
10		3/5/6		10.0			11/11/2003 13:06	
					Boring terminated at 11.5 feet -1315 hours - 11 NOV 03 No ground water observed Boring backfilled and patched by drillers			
15								
20								

Edward K. Noda and Associates, Inc.

FIGURE A-6

DRILL HOLE LOG

DRILL HOLE NO: **N-7**

PROJECT: **Upgrade Electrical, Phase 1, Hickam** PROJECT NO: **2396-01F**
CLIENT/OWNER: **MK Engineers** DATE: **11/11/2003**
DRILLER: **E.K Hirata and Associates, Inc** TOC ELEV:
DRILL RIG: **CME-55** HOLE DIAMETER: **4 inch** GS ELEV:
DEPTH TO WATER: **10.3** LOGGED BY: **D. Fraim**

DEPTH	WELL DETAILS	SOIL SYMBOLS, SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Sample Number	Description	PID (PPM)	Date Time	Recovery
0					Asphalt Pavement Section: 4" AC, 6" Portland Cement Concrete			
		6/13/24	MH	2.0	Brown Clayey SILT, very stiff to hard, plastic, moist (FILL?) - weak hydrocarbon odor in soil		11/11/2003 11:10	
5					Grayish brown VOLCANIC TUFF, moderately strong (HONOLULU VOLCANIC SERIES)			
10	▼	100 for 0.3'		10.0			11/11/2003 11:25	
					Boring terminated at 10.3 feet - 1135 hours - 11 NOV 03 No ground water observed Boring backfilled and patched by drillers			
15								
20								

Edward K. Noda and Associates, Inc.

FIGURE A-7

DRILL HOLE LOG

DRILL HOLE NO: **N-8**

PROJECT: **Upgrade Electrical, Phase 1, Hickam**
CLIENT/OWNER: **MK Engineers**
DRILLER: **E.K Hirata and Associates, Inc**
DRILL RIG: **CME-55** HOLE DIAMETER: **4 inch**
DEPTH TO WATER:

PROJECT NO: **2396-01F**
DATE: **11/11/2003**
TOC ELEV:
GS ELEV:
LOGGED BY: **D. Fraim**

DEPTH	WELL DETAILS	SOIL SYMBOLS, SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Sample Number	Description	PID (PPM)	Date Time	Recovery
0					AC Pavement Section: 3" Asphaltic Concrete, 6" Basalt Base Course			
			GW		Tan to white Sandy GRAVEL with Silt, dense, damp (FILL)			
		6/10/15	CH-MH	3.0	Dark grayish brown Silty CLAY with traces of Sand, very stiff to hard, plastic, moist (ALLUVIUM)		11/11/2003 10:08	
5								
					Grayish brown VOLCANIC TUFF, moderately strong to strong (HONOLULU VOLCANIC SERIES)			
		50 for 0.1'		10.0			11/11/2003 10:20	
10					Boring terminated at 10.1 feet - 1025 hours - 11 NOV 03 No ground water observed Boring backfilled and patched by drillers			
15								
20								

Edward K. Noda and Associates, Inc.

FIGURE A-8

DRILL HOLE LOG

DRILL HOLE NO: **N-9**

PROJECT: **Upgrade Electrical, Phase 1, Hickam**
CLIENT/OWNER: **MK Engineers**
DRILLER: **E.K Hirata and Associates, Inc**
DRILL RIG: **CME-55** HOLE DIAMETER: **4 inch**
DEPTH TO WATER:

PROJECT NO: **2396-01F**
DATE: **11/11/2003**
TOC ELEV:
GS ELEV:
LOGGED BY: **D. Fraim**

DEPTH	WELL DETAILS	SOIL SYMBOLS, SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Sample Number	Description	PID (PPM)	Date Time	Recovery
0					AC Pavement Section: 3" Asphaltic Concrete, 4" Coral Base Course			
			GW		Tan to white Sandy Gravel, dense, damp (FILL)			
		70 for 0.3'		3.0			11/11/2003 08:50	
5					Light grayish brown VOLCANIC TUFF, moderately strong (HONOLULU VOLCANIC SERIES) Weak petroleum odor in drill cuttings			
10		100 for 0.3'		10.0			11/11/2003 09:10	
					Boring terminated at 10.3 feet - 0915 hours - No ground water observed Boring backfilled and patched by drillers	11 NOV 03		
15								
20								

Edward K. Noda and Associates, Inc.

FIGURE A-9

DRILL HOLE LOG

DRILL HOLE NO: **N-10**

PROJECT: **Upgrade Electrical, Phase 1, Hickam**
CLIENT/OWNER: **MK Engineers**
DRILLER: **E.K Hirata and Associates, Inc**
DRILL RIG: **CME-55** HOLE DIAMETER: **4 inch**
DEPTH TO WATER:

PROJECT NO: **2396-01F**
DATE: **11/12/2003**
TOC ELEV:
GS ELEV:
LOGGED BY: **D. Fraim**

DEPTH	WELL DETAILS	SOIL SYMBOLS, SAMPLER SYMBOLS AND FIELD TEST DATA	USCS	Sample Number	Description	PID (PPM)	Date Time	Recovery
0					AC Pavement Section: 2" Asphaltic Concrete, 6" Basalt Base Course			
			GW	1.0	Tan to white Sandy GRAVEL, dense, damp (FILL)		11/12/2003 10:04	
		21/9/15	MH-CH		Grayish brown Silty CLAY, hard, moist, near plastic (ALLUVIUM)			
		11/24/52		3.0			11/12/2003 10:17	
5					Boring terminated at 4.5 feet - 1030 hours - 12 NOV 03 No ground water observed Boring backfilled and patched by drillers			
10								
15								
20								

Edward K. Noda and Associates, Inc.

FIGURE A-10

Appendix B

Laboratory Results

November 25, 2003

Dayton E. Fraim
Edward K. Noda & Associates
615 Piikoi Street, Suite 300
Honolulu, HI 96814
TEL: (808) 591-8553
FAX: (808) 593-8551

RE: Upgrade Electrical System, Phase 1, Hickam AFB Order No.: 0311087

Dear Dayton E. Fraim:

Oceanic Analytical Laboratory, Inc. received 6 samples on 11/12/2003 11:00:00 AM for the analyses presented in the following report.

All data presented in the following report are relevant only to the samples as received and to the items tested by the laboratory. The report shall not be reproduced except in full, without the written approval of the laboratory.

There were no problems with the analyses and all data for associated QC met laboratory specifications except where noted in the Case Narrative.

Applicable samples will be stored at no extra charge for a period of 30 days following the final report. Samples will be properly disposed of after 30 days, unless notified otherwise in writing.

If you have any questions regarding these tests results, please feel free to call.

Very truly yours,
OCEANIC ANALYTICAL LABORATORY, INC.

Kenneth K.F. Lee
Laboratory Director

Oceanic Analytical Laboratory, Inc.

Date: *Nov 25, 2003*

Client: Edward K. Noda & Associates
Project: Upgrade Electrical System, Phase 1, Hickam AF
Lab Order: 0311087
Date Received: 11/12/2003

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Collection Date	Sample On Hold
0311087-01A	N1-2.0	11/12/2003 8:35:00 AM	☐
0311087-01B	N1-2.0	11/12/2003 8:35:00 AM	☐
0311087-02A	N1-5.0	11/12/2003 8:44:00 AM	☐
0311087-02B	N1-5.0	11/12/2003 8:44:00 AM	☐
0311087-03A	N2-2.0	11/12/2003 9:20:00 AM	☐
0311087-03B	N2-2.0	11/12/2003 9:20:00 AM	☐
0311087-04A	N2-5.0	11/12/2003 9:25:00 AM	☐
0311087-04B	N2-5.0	11/12/2003 9:25:00 AM	☐
0311087-05A	N10-1.0	11/12/2003 10:04:00 AM	☐
0311087-05B	N10-1.0	11/12/2003 10:04:00 AM	☐
0311087-06A	N10-3.0	11/12/2003 10:17:00 AM	☐
0311087-06B	N10-3.0	11/12/2003 10:17:00 AM	☐

Oceanic Analytical Laboratory, Inc. — Date: *Nov 25, 2003*

Client:	Edward K. Noda & Associates
Project:	Upgrade Electrical System, Phase 1, Hickam AF
Lab Order:	0311087

CASE NARRATIVE

Samples were analyzed using the methods outlined in the following references:

Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW846, 3rd Edition.

All method blanks, laboratory spikes, and/or matrix spikes met quality assurance objectives.

A01: The closing contunuing calibration verification (CCV) for this surrogate failed high by 1.9% at 16.9%.

A02: The contunuing calibration verification (CCV) for this surrogate failed low by 10.6% at 69.4%.

Q01: The spike recovery for this QC sample is outside of established control limits. Review of associated batch QC indicates the recovery for this analyte does not represent an out-of-control condition for the batch.

Q02: The spike recovery for this QC sample is outside of established control limits due to sample matrix interference.

Q14: Visual examination indicates the RPD and/or matrix spike recovery is outside the control limit due to a nonhomogeneous sample matrix.

S04: The surrogate recovery for this sample is outside of established control limits due to a sample matrix effect.

Oceanic Analytical Laboratory, Inc.

Date: *Nov 25, 2003*

Client:	Edward K. Noda & Associates	**Client Sample ID:**	N1-2.0
Lab Order:	0311087	**Tag Number:**	
Project:	Upgrade Electrical System, Phase 1, Hickam AFB	**Collection Date:**	11/12/2003 8:35
Lab ID:	0311087-01A	**Matrix:**	SOIL

Analyses	Result	Reporting Limit	Units	Dilution Factor	Date Prepared	Date Analyzed	Batch ID	Analyst	Qual	Notes
ICP METALS, TCLP LEACHED			**SW1311/6010B**							
Arsenic	ND	0.500	mg/L	1	11/21/2003	11/21/2003	8417	TKL		
Barium	ND	1.00	mg/L	1						
Cadmium	ND	0.0500	mg/L	1						
Chromium	ND	0.100	mg/L	1						
Lead	ND	0.200	mg/L	1						
Selenium	ND	0.500	mg/L	1						
Silver	ND	0.200	mg/L	1						
ICP METALS-RCRA, TOTAL			**SW6010B**							
Arsenic	*20.0*	5.00	mg/Kg	1	11/18/2003	11/19/2003	8383	CLS		
Cadmium	ND	2.00	mg/Kg	1						
Chromium	*106*	5.00	mg/Kg	1						
Lead	*180*	20.0	mg/Kg	1						
MERCURY, TCLP LEACHED			**SW1311/7470**							
Mercury	ND	0.00250	mg/L	1	11/21/2003	11/21/2003	8419	SYL		
PAH BY EPA 8270 SIM			**SW8270C**							
Acenaphthene	ND	0.00667	mg/Kg	1	11/17/2003	11/23/2003	8367	SLK		
Benzo(a)pyrene	*0.0473*	0.00667	mg/Kg	1						
Fluoranthene	*0.0360*	0.00667	mg/Kg	1						
Naphthalene	ND	0.00667	mg/Kg	1						
Surr: 2-Fluorobiphenyl	53.6	30-115	%REC	1						
Surr: 4-Terphenyl-d14	40.0	18-137	%REC	1						
Surr: Nitrobenzene-d5	49.6	23-120	%REC	1						
PCBS IN SOIL OR SOLID WASTE			**SW8082**							
Aroclor 1016	ND	0.0333	mg/Kg	1	11/18/2003	11/19/2003	8378	SLK		
Aroclor 1221	ND	0.0667	mg/Kg	1						
Aroclor 1232	ND	0.0333	mg/Kg	1						
Aroclor 1242	ND	0.0333	mg/Kg	1						
Aroclor 1248	ND	0.0333	mg/Kg	1						
Aroclor 1254	ND	0.0333	mg/Kg	1						
Aroclor 1260	ND	0.0333	mg/Kg	1						
Surr: Decachlorobiphenyl	120	24-154	%REC	1						A01

Qualifiers:

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- R - RPD outside accepted recovery limits
- E - Value above quantitation range

✓ceanic Analytical Laboratory, Inc.

Date: *Nov 25, 2003*

ient:	Edward K. Noda & Associates	**Client Sample ID:**	N1-2.0
ib Order:	0311087	**Tag Number:**	
Project:	Upgrade Electrical System, Phase 1, Hickam AFB	**Collection Date:**	11/12/2003 8:35
ib ID:	0311087-01A	**Matrix:**	SOIL

Analyses	Result	Reporting Limit	Units	Dilution Factor	Date Prepared	Date Analyzed	Batch ID	Analyst	Qual	Notes
'H (FUEL FINGERPRINT)			**SW8015M**							
..PH (Diesel)	ND	5.00	mg/Kg	1	11/17/2003	11/18/2003	8368	MDH		
TPH (Jet A)	ND	5.00	mg/Kg	1						
PH (JP-4)	ND	5.00	mg/Kg	1						
PH (JP-5)	ND	5.00	mg/Kg	1						
TPH (Kerosene)	ND	5.00	mg/Kg	1						
TPH (Motor Oil)	ND	20.0	mg/Kg	1						
PH (Paint Thinner)	ND	5.00	mg/Kg	1						
PH (Unidentifed Hydrocarbons as Diesel)	ND	5.00	mg/Kg	1						
PH (Unidentifed Hydrocarbons as otor Oil)	*101*	20.0	mg/Kg	1						
Surr: Pentacosane	78.9	31-152	%REC	1						

Qualifiers:

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R - RPD outside accepted recovery limits

E - Value above quantitation range

Oceanic Analytical Laboratory, Inc.

Date: *Nov 25, 2003*

Client:	Edward K. Noda & Associates	**Client Sample ID:**	N1-2.0
Lab Order:	0311087	**Tag Number:**	
Project:	Upgrade Electrical System, Phase 1, Hickam AFB	**Collection Date:**	11/12/2003 8:35
Lab ID:	0311087-01B	**Matrix:**	SOIL

Analyses	Result	Reporting Limit	Units	Dilution Factor	Date Prepared	Date Analyzed	Batch ID	Analyst	Qual	Notes
TPH GASOLINE W/BTEX			**SW5030/8015M/8021B**							
Benzene	ND	0.0100	mg/Kg	1	11/20/2003	11/20/2003	R22356	SJR		
Ethylbenzene	ND	0.0100	mg/Kg	1						
m,p-Xylene	ND	0.0200	mg/Kg	1						
o-Xylene	ND	0.0100	mg/Kg	1						
Toluene	ND	0.0100	mg/Kg	1						
TPH (Gasoline C6-C12)	ND	1.00	mg/Kg	1						
Surr: a,a,a-Trifluorotoluene	91.4	54-126	%REC	1						

Qualifiers:

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Oceanic Analytical Laboratory, Inc.

Date: *Nov 25, 2003*

'lient:	Edward K. Noda & Associates	Client Sample ID:	N1-2.0
Lab Order:	0311087	Tag Number:	
"roject:	Upgrade Electrical System, Phase 1, Hickam AFB	Collection Date:	11/12/2003 8:35
ab ID:	0311087-01B	Matrix:	SOIL

nalyses	Result	Reporting Limit	Units	Dilution Factor	Date Prepared	Date Analyzed	Batch ID	Analyst	Qual	Notes
OLATILES BY GC/MS			SW8260B							
1,1,1,2-Tetrachloroethane	ND	0.0100	mg/Kg	1	11/15/2003	11/15/2003	R22260	KAL		
1,1,1-Trichloroethane	ND	0.0100	mg/Kg	1						
1,1,2,2-Tetrachloroethane	ND	0.0100	mg/Kg	1						
1,1,2-Trichloroethane	ND	0.0100	mg/Kg	1						
1,1-Dichloroethane	ND	0.0500	mg/Kg	1						
1,1-Dichloroethene	ND	0.0100	mg/Kg	1						
1,1-Dichloropropene	ND	0.0100	mg/Kg	1						
1,2,3-Trichlorobenzene	ND	0.0100	mg/Kg	1						
1,2,3-Trichloropropane	ND	0.0100	mg/Kg	1						
1,2,4-Trichlorobenzene	ND	0.0500	mg/Kg	1						
1,2,4-Trimethylbenzene	ND	0.0100	mg/Kg	1						
1,2-Dibromo-3-chloropropane	ND	0.0100	mg/Kg	1						
1,2-Dibromoethane	ND	0.0100	mg/Kg	1						
1,2-Dichlorobenzene	ND	0.0500	mg/Kg	1						
1,2-Dichloroethane	ND	0.0100	mg/Kg	1						
1,2-Dichloropropane	ND	0.0100	mg/Kg	1						
1,3,5-Trimethylbenzene	ND	0.0100	mg/Kg	1						
1,3-Dichlorobenzene	ND	0.0500	mg/Kg	1						
1,3-Dichloropropane	ND	0.0100	mg/Kg	1						
1,4-Dichlorobenzene	ND	0.0500	mg/Kg	1						
2,2-Dichloropropane	ND	0.0100	mg/Kg	1						
2-Butanone	ND	0.0500	mg/Kg	1						
2-Chlorotoluene	ND	0.0100	mg/Kg	1						
2-Hexanone	ND	0.0500	mg/Kg	1						
4-Chlorotoluene	ND	0.0100	mg/Kg	1						
4-Isopropyltoluene	ND	0.0100	mg/Kg	1						
4-Methyl-2-pentanone	ND	0.0500	mg/Kg	1						
Acetone	ND	0.0500	mg/Kg	1						
Acrylonitrile	ND	0.0500	mg/Kg	1						
Benzene	ND	0.0100	mg/Kg	1						
Bromobenzene	ND	0.0100	mg/Kg	1						
Bromochloromethane	ND	0.0500	mg/Kg	1						
Bromodichloromethane	ND	0.0100	mg/Kg	1						
Bromoform	ND	0.0100	mg/Kg	1						
Bromomethane	ND	0.100	mg/Kg	1						
Carbon disulfide	ND	0.0100	mg/Kg	1						
Carbon tetrachloride	ND	0.0100	mg/Kg	1						
Chlorobenzene	ND	0.0100	mg/Kg	1						
Chloroethane	ND	0.0500	mg/Kg	1						
Chloroform	ND	0.0100	mg/Kg	1						

Qualifiers:

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R - RPD outside accepted recovery limits

E - Value above quantitation range

Oceanic Analytical Laboratory, Inc.

Date: *Nov 25, 2003*

Client:	Edward K. Noda & Associates	**Client Sample ID:**	N1-2.0
Lab Order:	0311087	**Tag Number:**	
Project:	Upgrade Electrical System, Phase 1, Hickam AFB	**Collection Date:**	11/12/2003 8:35
Lab ID:	0311087-01B	**Matrix:**	SOIL

Analyses	Result	Reporting Limit	Units	Dilution Factor	Date Prepared	Date Analyzed	Batch ID	Analyst	Qual	Notes
Chloromethane	ND	0.0500	mg/Kg	1						
cis-1,2-Dichloroethene	ND	0.0100	mg/Kg	1						
cis-1,3-Dichloropropene	ND	0.0100	mg/Kg	1						
Dibromochloromethane	ND	0.0100	mg/Kg	1						
Dibromomethane	ND	0.0100	mg/Kg	1						
Dichlorodifluoromethane	ND	0.0500	mg/Kg	1						
Ethylbenzene	ND	0.0100	mg/Kg	1						
Hexachlorobutadiene	ND	0.0500	mg/Kg	1						
Iodomethane	ND	0.0500	mg/Kg	1						
Isopropylbenzene	ND	0.0100	mg/Kg	1						
m,p-Xylene	ND	0.0100	mg/Kg	1						
Methyl tert-butyl ether	ND	0.00500	mg/Kg	1						
Methylene chloride	ND	0.0500	mg/Kg	1						
n-Butylbenzene	ND	0.0100	mg/Kg	1						
n-Propylbenzene	ND	0.0100	mg/Kg	1						
Naphthalene	ND	0.0500	mg/Kg	1						
o-Xylene	ND	0.0100	mg/Kg	1						
sec-Butylbenzene	ND	0.0100	mg/Kg	1						
Styrene	ND	0.0100	mg/Kg	1						
tert-Butylbenzene	ND	0.0100	mg/Kg	1						
Tetrachloroethene	ND	0.0100	mg/Kg	1						
Toluene	ND	0.0100	mg/Kg	1						
trans-1,2-Dichloroethene	ND	0.0100	mg/Kg	1						
trans-1,3-Dichloropropene	ND	0.0100	mg/Kg	1						
trans-1,4-Dichloro-2-butene	ND	0.0500	mg/Kg	1						
Trichloroethene	ND	0.0100	mg/Kg	1						
Trichlorofluoromethane	ND	0.0100	mg/Kg	1						
Vinyl acetate	ND	0.0500	mg/Kg	1						
Vinyl chloride	ND	0.0500	mg/Kg	1						
Surr: 1,2-Dichloroethane-d4	143	58-180	%REC	1						
Surr: 4-Bromofluorobenzene	145	69-173	%REC	1						
Surr: Dibromofluoromethane	120	71-142	%REC	1						
Surr: Toluene-d8	115	87-126	%REC	1						

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E - Value above quantitation range

Oceanic Analytical Laboratory, Inc.

Date: *Nov 25, 2003*

lient:	Edward K. Noda & Associates	**Client Sample ID:**	N1-5.0
Lab Order:	0311087	**Tag Number:**	
Project:	Upgrade Electrical System, Phase 1, Hickam AFB	**Collection Date:**	11/12/2003 8:44
ab ID:	0311087-02A	**Matrix:**	SOIL

nalyses	Result	Reporting Limit	Units	Dilution Factor	Date Prepared	Date Analyzed	Batch ID	Analyst	Qual	Notes
:P METALS, TCLP LEACHED			**SW1311/6010B**							
Arsenic	ND	0.500	mg/L	1	11/21/2003	11/21/2003	8417	TKL		
Barium	ND	1.00	mg/L	1						
:admium	ND	0.0500	mg/L	1						
:hromium	ND	0.100	mg/L	1						
Lead	ND	0.200	mg/L	1						
;elenium	ND	0.500	mg/L	1						
;ilver	ND	0.200	mg/L	1						
ICP METALS-RCRA, TOTAL			**SW6010B**							
\rsenic	ND	5.00	mg/Kg	1	11/18/2003	11/19/2003	8383	CLS		
:admium	ND	2.00	mg/Kg	1						
Chromium	*14.6*	5.00	mg/Kg	1						
'ead	ND	20.0	mg/Kg	1						
IERCURY, TCLP LEACHED			**SW1311/7470**							
Mercury	ND	0.00250	mg/L	1	11/21/2003	11/21/2003	8419	SYL		
'AH BY EPA 8270 SIM			**SW8270C**							
\cenaphthene	ND	0.00667	mg/Kg	1	11/17/2003	11/23/2003	8367	SLK		
Benzo(a)pyrene	ND	0.00667	mg/Kg	1						
=luoranthene	ND	0.00667	mg/Kg	1						
\aphthalene	ND	0.00667	mg/Kg	1						
Surr: 2-Fluorobiphenyl	49.1	30-115	%REC	1						
Surr: 4-Terphenyl-d14	46.6	18-137	%REC	1						
Surr: Nitrobenzene-d5	47.9	23-120	%REC	1						
PCBS IN SOIL OR SOLID WASTE			**SW8082**							
Aroclor 1016	ND	0.0333	mg/Kg	1	11/18/2003	11/19/2003	8378	SLK		
Aroclor 1221	ND	0.0667	mg/Kg	1						
Aroclor 1232	ND	0.0333	mg/Kg	1						
Aroclor 1242	ND	0.0333	mg/Kg	1						
Aroclor 1248	ND	0.0333	mg/Kg	1						
Aroclor 1254	ND	0.0333	mg/Kg	1						
Aroclor 1260	ND	0.0333	mg/Kg	1						
Surr: Decachlorobiphenyl	69.4	24-154	%REC	1						A01

Qualifiers:

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Oceanic Analytical Laboratory, Inc.

Date: *Nov 25, 2003*

Client:	Edward K. Noda & Associates	**Client Sample ID:**	N1-5.0
Lab Order:	0311087	**Tag Number:**	
Project:	Upgrade Electrical System, Phase 1, Hickam AFB	**Collection Date:**	11/12/2003 8:44
Lab ID:	0311087-02A	**Matrix:**	SOIL

Analyses	Result	Reporting Limit	Units	Dilution Factor	Date Prepared	Date Analyzed	Batch ID	Analyst	Qual	Notes
TPH (FUEL FINGERPRINT)			**SW8015M**							
TPH (Diesel)	ND	5.00	mg/Kg	1	11/17/2003	11/18/2003	8368	MDH		
TPH (Jet A)	ND	5.00	mg/Kg	1						
TPH (JP-4)	ND	5.00	mg/Kg	1						
TPH (JP-5)	ND	5.00	mg/Kg	1						
TPH (Kerosene)	ND	5.00	mg/Kg	1						
TPH (Motor Oil)	ND	20.0	mg/Kg	1						
TPH (Paint Thinner)	ND	5.00	mg/Kg	1						
TPH (Unidentifed Hydrocarbons as Diesel)	ND	5.00	mg/Kg	1						
TPH (Unidentifed Hydrocarbons as Motor Oil)	***51.3***	20.0	mg/Kg	1						
Surr: Pentacosane	74.2	31-152	%REC	1						

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R - RPD outside accepted recovery limits

E - Value above quantitation range

Oceanic Analytical Laboratory, Inc.

Date: *Nov 25, 2003*

lient:	Edward K. Noda & Associates	**Client Sample ID:**	N1-5.0
Lab Order:	0311087	**Tag Number:**	
roject:	Upgrade Electrical System, Phase 1, Hickam AFB	**Collection Date:**	11/12/2003 8:44
ab ID:	0311087-02B	**Matrix:**	SOIL

nalyses	Result	Reporting Limit	Units	Dilution Factor	Date Prepared	Date Analyzed	Batch ID	Analyst	Qual	Notes
.PH GASOLINE W/BTEX			**SW5030/8015M/8021B**							
Benzene	ND	0.0100	mg/Kg	1	11/20/2003	11/20/2003	R22356	SJR		
:thylbenzene	ND	0.0100	mg/Kg	1						
n,p-Xylene	ND	0.0200	mg/Kg	1						
o-Xylene	ND	0.0100	mg/Kg	1						
Toluene	ND	0.0100	mg/Kg	1						
'PH (Gasoline C6-C12)	ND	1.00	mg/Kg	1						
Surr: a,a,a-Trifluorotoluene	100	54-126	%REC	1						

Qualifiers:

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Oceanic Analytical Laboratory, Inc.

Date: *Nov 25, 2003*

Client:	Edward K. Noda & Associates	**Client Sample ID:**	N1-5.0
Lab Order:	0311087	**Tag Number:**	
Project:	Upgrade Electrical System, Phase 1, Hickam AFB	**Collection Date:**	11/12/2003 8:44
Lab ID:	0311087-02B	**Matrix:**	SOIL

Analyses	Result	Reporting Limit	Units	Dilution Factor	Date Prepared	Date Analyzed	Batch ID	Analyst	Qual	Notes
VOLATILES BY GC/MS			SW8260B							
1,1,1,2-Tetrachloroethane	ND	0.0100	mg/Kg	1	11/15/2003	11/15/2003	R22260	KAL		
1,1,1-Trichloroethane	ND	0.0100	mg/Kg	1						
1,1,2,2-Tetrachloroethane	ND	0.0100	mg/Kg	1						
1,1,2-Trichloroethane	ND	0.0100	mg/Kg	1						
1,1-Dichloroethane	ND	0.0500	mg/Kg	1						
1,1-Dichloroethene	ND	0.0100	mg/Kg	1						
1,1-Dichloropropene	ND	0.0100	mg/Kg	1						
1,2,3-Trichlorobenzene	ND	0.0100	mg/Kg	1						
1,2,3-Trichloropropane	ND	0.0100	mg/Kg	1						
1,2,4-Trichlorobenzene	ND	0.0500	mg/Kg	1						
1,2,4-Trimethylbenzene	ND	0.0100	mg/Kg	1						
1,2-Dibromo-3-chloropropane	ND	0.0100	mg/Kg	1						
1,2-Dibromoethane	ND	0.0100	mg/Kg	1						
1,2-Dichlorobenzene	ND	0.0500	mg/Kg	1						
1,2-Dichloroethane	ND	0.0100	mg/Kg	1						
1,2-Dichloropropane	ND	0.0100	mg/Kg	1						
1,3,5-Trimethylbenzene	ND	0.0100	mg/Kg	1						
1,3-Dichlorobenzene	ND	0.0500	mg/Kg	1						
1,3-Dichloropropane	ND	0.0100	mg/Kg	1						
1,4-Dichlorobenzene	ND	0.0500	mg/Kg	1						
2,2-Dichloropropane	ND	0.0100	mg/Kg	1						
2-Butanone	ND	0.0500	mg/Kg	1						
2-Chlorotoluene	ND	0.0100	mg/Kg	1						
2-Hexanone	ND	0.0500	mg/Kg	1						
4-Chlorotoluene	ND	0.0100	mg/Kg	1						
4-Isopropyltoluene	ND	0.0100	mg/Kg	1						
4-Methyl-2-pentanone	ND	0.0500	mg/Kg	1						
Acetone	ND	0.0500	mg/Kg	1						
Acrylonitrile	ND	0.0500	mg/Kg	1						
Benzene	ND	0.0100	mg/Kg	1						
Bromobenzene	ND	0.0100	mg/Kg	1						
Bromochloromethane	ND	0.0500	mg/Kg	1						
Bromodichloromethane	ND	0.0100	mg/Kg	1						
Bromoform	ND	0.0100	mg/Kg	1						
Bromomethane	ND	0.100	mg/Kg	1						
Carbon disulfide	ND	0.0100	mg/Kg	1						
Carbon tetrachloride	ND	0.0100	mg/Kg	1						
Chlorobenzene	ND	0.0100	mg/Kg	1						
Chloroethane	ND	0.0500	mg/Kg	1						
Chloroform	ND	0.0100	mg/Kg	1						

Qualifiers:

ND - Not Detected at the Reporting Limit

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R - RPD outside accepted recovery limits

E - Value above quantitation range

Oceanic Analytical Laboratory, Inc.

Date: *Nov 25, 2003*

Client:	Edward K. Noda & Associates	**Client Sample ID:**	N1-5.0
Lab Order:	0311087	**Tag Number:**	
Project:	Upgrade Electrical System, Phase 1, Hickam AFB	**Collection Date:**	11/12/2003 8:44
Lab ID:	0311087-02B	**Matrix:**	SOIL

Analyses	Result	Reporting Limit	Units	Dilution Factor	Date Prepared	Date Analyzed	Batch ID	Analyst	Qual	Notes
Chloromethane	ND	0.0500	mg/Kg	1						
cis-1,2-Dichloroethene	ND	0.0100	mg/Kg	1						
cis-1,3-Dichloropropene	ND	0.0100	mg/Kg	1						
Dibromochloromethane	ND	0.0100	mg/Kg	1						
Dibromomethane	ND	0.0100	mg/Kg	1						
Dichlorodifluoromethane	ND	0.0500	mg/Kg	1						
Ethylbenzene	ND	0.0100	mg/Kg	1						
Hexachlorobutadiene	ND	0.0500	mg/Kg	1						
Iodomethane	ND	0.0500	mg/Kg	1						
Isopropylbenzene	ND	0.0100	mg/Kg	1						
m,p-Xylene	ND	0.0100	mg/Kg	1						
Methyl tert-butyl ether	ND	0.00500	mg/Kg	1						
Methylene chloride	ND	0.0500	mg/Kg	1						
n-Butylbenzene	ND	0.0100	mg/Kg	1						
n-Propylbenzene	ND	0.0100	mg/Kg	1						
Naphthalene	ND	0.0500	mg/Kg	1						
o-Xylene	ND	0.0100	mg/Kg	1						
sec-Butylbenzene	ND	0.0100	mg/Kg	1						
Styrene	ND	0.0100	mg/Kg	1						
tert-Butylbenzene	ND	0.0100	mg/Kg	1						
Tetrachloroethene	ND	0.0100	mg/Kg	1						
Toluene	ND	0.0100	mg/Kg	1						
trans-1,2-Dichloroethene	ND	0.0100	mg/Kg	1						
trans-1,3-Dichloropropene	ND	0.0100	mg/Kg	1						
trans-1,4-Dichloro-2-butene	ND	0.0500	mg/Kg	1						
Trichloroethene	ND	0.0100	mg/Kg	1						
Trichlorofluoromethane	ND	0.0100	mg/Kg	1						
Vinyl acetate	ND	0.0500	mg/Kg	1						
Vinyl chloride	ND	0.0500	mg/Kg	1						
Surr: 1,2-Dichloroethane-d4	133	58-180	%REC	1						
Surr: 4-Bromofluorobenzene	108	69-173	%REC	1						
Surr: Dibromofluoromethane	99.3	71-142	%REC	1						
Surr: Toluene-d8	101	87-126	%REC	1						

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

* - Value exceeds Maximum Contaminant Level

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

Oceanic Analytical Laboratory, Inc.

Date: *Nov 25, 2003*

Client:	Edward K. Noda & Associates	**Client Sample ID:**	N2-2.0
Lab Order:	0311087	**Tag Number:**	
Project:	Upgrade Electrical System, Phase 1, Hickam AFB	**Collection Date:**	11/12/2003 9:20
Lab ID:	0311087-03A	**Matrix:**	SOIL

Analyses	Result	Reporting Limit	Units	Dilution Factor	Date Prepared	Date Analyzed	Batch ID	Analyst	Qual	Notes
ICP METALS, TCLP LEACHED			**SW1311/6010B**							
Arsenic	ND	0.500	mg/L	1	11/21/2003	11/21/2003	8417	TKL		
Barium	ND	1.00	mg/L	1						
Cadmium	ND	0.0500	mg/L	1						
Chromium	ND	0.100	mg/L	1						
Lead	ND	0.200	mg/L	1						
Selenium	ND	0.500	mg/L	1						
Silver	ND	0.200	mg/L	1						
ICP METALS-RCRA, TOTAL			**SW6010B**							
Arsenic	*5.30*	5.00	mg/Kg	1	11/18/2003	11/19/2003	8383	CLS		
Cadmium	ND	2.00	mg/Kg	1						
Chromium	*18.5*	5.00	mg/Kg	1						
Lead	ND	20.0	mg/Kg	1						
MERCURY, TCLP LEACHED			**SW1311/7470**							
Mercury	ND	0.00250	mg/L	1	11/21/2003	11/21/2003	8419	SYL		
PAH BY EPA 8270 SIM			**SW8270C**							
Acenaphthene	ND	0.00667	mg/Kg	1	11/17/2003	11/23/2003	8367	SLK		
Benzo(a)pyrene	ND	0.00667	mg/Kg	1						
Fluoranthene	ND	0.00667	mg/Kg	1						
Naphthalene	ND	0.00667	mg/Kg	1						
Surr: 2-Fluorobiphenyl	36.0	30-115	%REC	1						
Surr: 4-Terphenyl-d14	42.1	18-137	%REC	1						
Surr: Nitrobenzene-d5	35.8	23-120	%REC	1						
PCBS IN SOIL OR SOLID WASTE			**SW8082**							
Aroclor 1016	ND	0.0333	mg/Kg	1	11/18/2003	11/19/2003	8378	SLK		
Aroclor 1221	ND	0.0667	mg/Kg	1						
Aroclor 1232	ND	0.0333	mg/Kg	1						
Aroclor 1242	ND	0.0333	mg/Kg	1						
Aroclor 1248	ND	0.0333	mg/Kg	1						
Aroclor 1254	ND	0.0333	mg/Kg	1						
Aroclor 1260	ND	0.0333	mg/Kg	1						
Surr: Decachlorobiphenyl	121	24-154	%REC	1						A01

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

* - Value exceeds Maximum Contaminant Level

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

Oceanic Analytical Laboratory, Inc.

Date: *Nov 25, 2003*

lient:	Edward K. Noda & Associates	**Client Sample ID:**	N2-2.0
Lab Order:	0311087	**Tag Number:**	
roject:	Upgrade Electrical System, Phase 1, Hickam AFB	**Collection Date:**	11/12/2003 9:20
ab ID:	0311087-03A	**Matrix:**	SOIL

nalyses	Result	Reporting Limit	Units	Dilution Factor	Date Prepared	Date Analyzed	Batch ID	Analyst	Qual	Notes
PH (FUEL FINGERPRINT)			**SW8015M**							
TPH (Diesel)	ND	5.00	mg/Kg	1	11/17/2003	11/18/2003	8368	MDH		
TPH (Jet A)	ND	5.00	mg/Kg	1						
TPH (JP-4)	ND	5.00	mg/Kg	1						
TPH (JP-5)	ND	5.00	mg/Kg	1						
TPH (Kerosene)	ND	5.00	mg/Kg	1						
TPH (Motor Oil)	ND	20.0	mg/Kg	1						
TPH (Paint Thinner)	ND	5.00	mg/Kg	1						
TPH (Unidentifed Hydrocarbons as Diesel)	ND	5.00	mg/Kg	1						
TPH (Unidentifed Hydrocarbons as Motor Oil)	*20.6*	20.0	mg/Kg	1						
Surr: Pentacosane	78.9	31-152	%REC	1						

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

* - Value exceeds Maximum Contaminant Level

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

Oceanic Analytical Laboratory, Inc.

Date: *Nov 25, 2003*

Client:	Edward K. Noda & Associates	**Client Sample ID:**	N2-2.0
Lab Order:	0311087	**Tag Number:**	
Project:	Upgrade Electrical System, Phase 1, Hickam AFB	**Collection Date:**	11/12/2003 9:20
Lab ID:	0311087-03B	**Matrix:**	SOIL

Analyses	Result	Reporting Limit	Units	Dilution Factor	Date Prepared	Date Analyzed	Batch ID	Analyst	Qual	Notes
TPH GASOLINE W/BTEX			**SW5030/8015M/8021B**							
Benzene	ND	0.0100	mg/Kg	1	11/20/2003	11/20/2003	R22356	SJR		
Ethylbenzene	ND	0.0100	mg/Kg	1						
m,p-Xylene	ND	0.0200	mg/Kg	1						
o-Xylene	ND	0.0100	mg/Kg	1						
Toluene	ND	0.0100	mg/Kg	1						
TPH (Gasoline C6-C12)	ND	1.00	mg/Kg	1						
Surr: a,a,a-Trifluorotoluene	97.0	54-126	%REC	1						

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

* - Value exceeds Maximum Contaminant Level

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

Oceanic Analytical Laboratory, Inc. Date: *Nov 25, 2003*

lient:	Edward K. Noda & Associates	Client Sample ID:	N2-2.0
Lab Order:	0311087	Tag Number:	
Project:	Upgrade Electrical System, Phase 1, Hickam AFB	Collection Date:	11/12/2003 9:20
ab ID:	0311087-03B	Matrix:	SOIL

Analyses	Result	Reporting Limit	Units	Dilution Factor	Date Prepared	Date Analyzed	Batch ID	Analyst	Qual	Notes
OLATILES BY GC/MS			SW8260B							
1,1,1,2-Tetrachloroethane	ND	0.0100	mg/Kg	1	11/15/2003	11/15/2003	R22260	KAL		
1,1,1-Trichloroethane	ND	0.0100	mg/Kg	1						
,1,2,2-Tetrachloroethane	ND	0.0100	mg/Kg	1						
,1,2-Trichloroethane	ND	0.0100	mg/Kg	1						
1,1-Dichloroethane	ND	0.0500	mg/Kg	1						
,1-Dichloroethene	ND	0.0100	mg/Kg	1						
.1-Dichloropropene	ND	0.0100	mg/Kg	1						
1,2,3-Trichlorobenzene	ND	0.0100	mg/Kg	1						
1,2,3-Trichloropropane	ND	0.0100	mg/Kg	1						
2,4-Trichlorobenzene	ND	0.0500	mg/Kg	1						
,2,4-Trimethylbenzene	ND	0.0100	mg/Kg	1						
1,2-Dibromo-3-chloropropane	ND	0.0100	mg/Kg	1						
2-Dibromoethane	ND	0.0100	mg/Kg	1						
2-Dichlorobenzene	ND	0.0500	mg/Kg	1						
1,2-Dichloroethane	ND	0.0100	mg/Kg	1						
1 2-Dichloropropane	ND	0.0100	mg/Kg	1						
3,5-Trimethylbenzene	ND	0.0100	mg/Kg	1						
,3-Dichlorobenzene	ND	0.0500	mg/Kg	1						
1,3-Dichloropropane	ND	0.0100	mg/Kg	1						
4-Dichlorobenzene	ND	0.0500	mg/Kg	1						
2-Dichloropropane	ND	0.0100	mg/Kg	1						
2-Butanone	ND	0.0500	mg/Kg	1						
Chlorotoluene	ND	0.0100	mg/Kg	1						
Hexanone	ND	0.0500	mg/Kg	1						
4-Chlorotoluene	ND	0.0100	mg/Kg	1						
4-Isopropyltoluene	ND	0.0100	mg/Kg	1						
Methyl-2-pentanone	ND	0.0500	mg/Kg	1						
cetone	ND	0.0500	mg/Kg	1						
Acrylonitrile	ND	0.0500	mg/Kg	1						
nzene	ND	0.0100	mg/Kg	1						
omobenzene	ND	0.0100	mg/Kg	1						
Bromochloromethane	ND	0.0500	mg/Kg	1						
Bromodichloromethane	ND	0.0100	mg/Kg	1						
omoform	ND	0.0100	mg/Kg	1						
Bromomethane	ND	0.100	mg/Kg	1						
Carbon disulfide	ND	0.0100	mg/Kg	1						
rbon tetrachloride	ND	0.0100	mg/Kg	1						
lorobenzene	ND	0.0100	mg/Kg	1						
Chloroethane	ND	0.0500	mg/Kg	1						
loroform	ND	0.0100	mg/Kg	1						

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

* - Value exceeds Maximum Contaminant Level

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

Oceanic Analytical Laboratory, Inc.

Date: *Nov 25, 2003*

Client:	Edward K. Noda & Associates	**Client Sample ID:**	N2-2.0
Lab Order:	0311087	**Tag Number:**	
Project:	Upgrade Electrical System, Phase 1, Hickam AFB	**Collection Date:**	11/12/2003 9:20
Lab ID:	0311087-03B	**Matrix:**	SOIL

Analyses	Result	Reporting Limit	Units	Dilution Factor	Date Prepared	Date Analyzed	Batch ID	Analyst	Qual	Notes
Chloromethane	ND	0.0500	mg/Kg	1						
cis-1,2-Dichloroethene	ND	0.0100	mg/Kg	1						
cis-1,3-Dichloropropene	ND	0.0100	mg/Kg	1						
Dibromochloromethane	ND	0.0100	mg/Kg	1						
Dibromomethane	ND	0.0100	mg/Kg	1						
Dichlorodifluoromethane	ND	0.0500	mg/Kg	1						
Ethylbenzene	ND	0.0100	mg/Kg	1						
Hexachlorobutadiene	ND	0.0500	mg/Kg	1						
Iodomethane	ND	0.0500	mg/Kg	1						
Isopropylbenzene	ND	0.0100	mg/Kg	1						
m,p-Xylene	ND	0.0100	mg/Kg	1						
Methyl tert-butyl ether	ND	0.00500	mg/Kg	1						
Methylene chloride	ND	0.0500	mg/Kg	1						
n-Butylbenzene	ND	0.0100	mg/Kg	1						
n-Propylbenzene	ND	0.0100	mg/Kg	1						
Naphthalene	ND	0.0500	mg/Kg	1						
o-Xylene	ND	0.0100	mg/Kg	1						
sec-Butylbenzene	ND	0.0100	mg/Kg	1						
Styrene	ND	0.0100	mg/Kg	1						
tert-Butylbenzene	ND	0.0100	mg/Kg	1						
Tetrachloroethene	ND	0.0100	mg/Kg	1						
Toluene	ND	0.0100	mg/Kg	1						
trans-1,2-Dichloroethene	ND	0.0100	mg/Kg	1						
trans-1,3-Dichloropropene	ND	0.0100	mg/Kg	1						
trans-1,4-Dichloro-2-butene	ND	0.0500	mg/Kg	1						
Trichloroethene	ND	0.0100	mg/Kg	1						
Trichlorofluoromethane	ND	0.0100	mg/Kg	1						
Vinyl acetate	ND	0.0500	mg/Kg	1						
Vinyl chloride	ND	0.0500	mg/Kg	1						
Surr: 1,2-Dichloroethane-d4	123	58-180	%REC	1						
Surr: 4-Bromofluorobenzene	114	69-173	%REC	1						
Surr: Dibromofluoromethane	100	71-142	%REC	1						
Surr: Toluene-d8	99.9	87-126	%REC	1						

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S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

Oceanic Analytical Laboratory, Inc.

Date: *Nov 25, 2003*

Client:	Edward K. Noda & Associates	**Client Sample ID:**	N2-5.0
Lab Order:	0311087	**Tag Number:**	
Project:	Upgrade Electrical System, Phase 1, Hickam AFB	**Collection Date:**	11/12/2003 9:25
Lab ID:	0311087-04A	**Matrix:**	SOIL

Analyses	Result	Reporting Limit	Units	Dilution Factor	Date Prepared	Date Analyzed	Batch ID	Analyst	Qual	Notes
ICP METALS, TCLP LEACHED			**SW1311/6010B**							
Arsenic	ND	0.500	mg/L	1	11/21/2003	11/21/2003	8417	TKL		
Barium	ND	1.00	mg/L	1						
Cadmium	ND	0.0500	mg/L	1						
Chromium	ND	0.100	mg/L	1						
Lead	ND	0.200	mg/L	1						
Selenium	ND	0.500	mg/L	1						
Silver	ND	0.200	mg/L	1						
ICP METALS-RCRA, TOTAL			**SW6010B**							
Arsenic	ND	5.00	mg/Kg	1	11/18/2003	11/19/2003	8383	CLS		
Cadmium	ND	2.00	mg/Kg	1						
Chromium	*12.5*	5.00	mg/Kg	1						
Lead	ND	20.0	mg/Kg	1						
MERCURY, TCLP LEACHED			**SW1311/7470**							
Mercury	ND	0.00250	mg/L	1	11/21/2003	11/21/2003	8419	SYL		
PAH BY EPA 8270 SIM			**SW8270C**							
Acenaphthene	ND	0.00667	mg/Kg	1	11/17/2003	11/23/2003	8367	SLK		
Benzo(a)pyrene	ND	0.00667	mg/Kg	1						
Fluoranthene	ND	0.00667	mg/Kg	1						
Naphthalene	ND	0.00667	mg/Kg	1						
Surr: 2-Fluorobiphenyl	44.6	30-115	%REC	1						
Surr: 4-Terphenyl-d14	42.0	18-137	%REC	1						A02
Surr: Nitrobenzene-d5	44.0	23-120	%REC	1						
PCBS IN SOIL OR SOLID WASTE			**SW8082**							
Aroclor 1016	ND	0.0333	mg/Kg	1	11/18/2003	11/19/2003	8378	SLK		
Aroclor 1221	ND	0.0667	mg/Kg	1						
Aroclor 1232	ND	0.0333	mg/Kg	1						
Aroclor 1242	ND	0.0333	mg/Kg	1						
Aroclor 1248	ND	0.0333	mg/Kg	1						
Aroclor 1254	ND	0.0333	mg/Kg	1						
Aroclor 1260	ND	0.0333	mg/Kg	1						
Surr: Decachlorobiphenyl	126	24-154	%REC	1						A01

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
* - Value exceeds Maximum Contaminant Level
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range

Oceanic Analytical Laboratory, Inc.

Date: *Nov 25, 2003*

Client:	Edward K. Noda & Associates	**Client Sample ID:**	N2-5.0
Lab Order:	0311087	**Tag Number:**	
Project:	Upgrade Electrical System, Phase 1, Hickam AFB	**Collection Date:**	11/12/2003 9:25
Lab ID:	0311087-04A	**Matrix:**	SOIL

Analyses	Result	Reporting Limit	Units	Dilution Factor	Date Prepared	Date Analyzed	Batch ID	Analyst	Qual	Notes
TPH (FUEL FINGERPRINT)			**SW8015M**							
TPH (Diesel)	ND	5.00	mg/Kg	1	11/17/2003	11/18/2003	8368	MDH		
TPH (Jet A)	ND	5.00	mg/Kg	1						
TPH (JP-4)	ND	5.00	mg/Kg	1						
TPH (JP-5)	ND	5.00	mg/Kg	1						
TPH (Kerosene)	ND	5.00	mg/Kg	1						
TPH (Motor Oil)	ND	20.0	mg/Kg	1						
TPH (Paint Thinner)	ND	5.00	mg/Kg	1						
TPH (Unidentifed Hydrocarbons as Diesel)	ND	5.00	mg/Kg	1						
TPH (Unidentifed Hydrocarbons as Motor Oil)	ND	20.0	mg/Kg	1						
Surr: Pentacosane	73.6	31-152	%REC	1						

Qualifiers:

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S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range

ᴜceanic Analytical Laboratory, Inc.

Date: *Nov 25, 2003*

.ient:	Edward K. Noda & Associates	**Client Sample ID:**	N2-5.0
Lab Order:	0311087	**Tag Number:**	
Project:	Upgrade Electrical System, Phase 1, Hickam AFB	**Collection Date:**	11/12/2003 9:25
ıb ID:	0311087-04B	**Matrix:**	SOIL

ıalyses	Result	Reporting Limit	Units	Dilution Factor	Date Prepared	Date Analyzed	Batch ID	Analyst	Qual	Notes
ʼH GASOLINE W/BTEX			**SW5030/8015M/8021B**							
Benzene	ND	0.0100	mg/Kg	1	11/20/2003	11/20/2003	R22356	SJR		
Ethylbenzene	ND	0.0100	mg/Kg	1						
ı,p-Xylene	ND	0.0200	mg/Kg	1						
ᴗ-Xylene	ND	0.0100	mg/Kg	1						
Toluene	ND	0.0100	mg/Kg	1						
PH (Gasoline C6-C12)	ND	1.00	mg/Kg	1						
Surr: a,a,a-Trifluorotoluene	99.3	54-126	%REC	1						

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

* - Value exceeds Maximum Contaminant Level

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

Oceanic Analytical Laboratory, Inc.

Date: *Nov 25, 2003*

Client:	Edward K. Noda & Associates	**Client Sample ID:**	N2-5.0
Lab Order:	0311087	**Tag Number:**	
Project:	Upgrade Electrical System, Phase 1, Hickam AFB	**Collection Date:**	11/12/2003 9:25
Lab ID:	0311087-04B	**Matrix:**	SOIL

Analyses	Result	Reporting Limit	Units	Dilution Factor	Date Prepared	Date Analyzed	Batch ID	Analyst	Qual	Notes
VOLATILES BY GC/MS			**SW8260B**							
1,1,1,2-Tetrachloroethane	ND	0.0100	mg/Kg	1	11/15/2003	11/15/2003	R22260	KAL		
1,1,1-Trichloroethane	ND	0.0100	mg/Kg	1						
1,1,2,2-Tetrachloroethane	ND	0.0100	mg/Kg	1						
1,1,2-Trichloroethane	ND	0.0100	mg/Kg	1						
1,1-Dichloroethane	ND	0.0500	mg/Kg	1						
1,1-Dichloroethene	ND	0.0100	mg/Kg	1						
1,1-Dichloropropene	ND	0.0100	mg/Kg	1						
1,2,3-Trichlorobenzene	ND	0.0100	mg/Kg	1						
1,2,3-Trichloropropane	ND	0.0100	mg/Kg	1						
1,2,4-Trichlorobenzene	ND	0.0500	mg/Kg	1						
1,2,4-Trimethylbenzene	ND	0.0100	mg/Kg	1						
1,2-Dibromo-3-chloropropane	ND	0.0100	mg/Kg	1						
1,2-Dibromoethane	ND	0.0100	mg/Kg	1						
1,2-Dichlorobenzene	ND	0.0500	mg/Kg	1						
1,2-Dichloroethane	ND	0.0100	mg/Kg	1						
1,2-Dichloropropane	ND	0.0100	mg/Kg	1						
1,3,5-Trimethylbenzene	ND	0.0100	mg/Kg	1						
1,3-Dichlorobenzene	ND	0.0500	mg/Kg	1						
1,3-Dichloropropane	ND	0.0100	mg/Kg	1						
1,4-Dichlorobenzene	ND	0.0500	mg/Kg	1						
2,2-Dichloropropane	ND	0.0100	mg/Kg	1						
2-Butanone	ND	0.0500	mg/Kg	1						
2-Chlorotoluene	ND	0.0100	mg/Kg	1						
2-Hexanone	ND	0.0500	mg/Kg	1						
4-Chlorotoluene	ND	0.0100	mg/Kg	1						
4-Isopropyltoluene	ND	0.0100	mg/Kg	1						
4-Methyl-2-pentanone	ND	0.0500	mg/Kg	1						
Acetone	ND	0.0500	mg/Kg	1						
Acrylonitrile	ND	0.0500	mg/Kg	1						
Benzene	ND	0.0100	mg/Kg	1						
Bromobenzene	ND	0.0100	mg/Kg	1						
Bromochloromethane	ND	0.0500	mg/Kg	1						
Bromodichloromethane	ND	0.0100	mg/Kg	1						
Bromoform	ND	0.0100	mg/Kg	1						
Bromomethane	ND	0.100	mg/Kg	1						
Carbon disulfide	ND	0.0100	mg/Kg	1						
Carbon tetrachloride	ND	0.0100	mg/Kg	1						
Chlorobenzene	ND	0.0100	mg/Kg	1						
Chloroethane	ND	0.0500	mg/Kg	1						
Chloroform	ND	0.0100	mg/Kg	1						

Qualifiers:

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
* - Value exceeds Maximum Contaminant Level
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range

Oceanic Analytical Laboratory, Inc.

Date: *Nov 25, 2003*

lient:	Edward K. Noda & Associates	Client Sample ID:	N2-5.0
Lab Order:	0311087	Tag Number:	
"roject:	Upgrade Electrical System, Phase 1, Hickam AFB	Collection Date:	11/12/2003 9:25
ab ID:	0311087-04B	Matrix:	SOIL

nalyses	Result	Reporting Limit	Units	Dilution Factor	Date Prepared	Date Analyzed	Batch ID	Analyst	Qual	Notes
:hloromethane	ND	0.0500	mg/Kg	1						
cis-1,2-Dichloroethene	ND	0.0100	mg/Kg	1						
cis-1,3-Dichloropropene	ND	0.0100	mg/Kg	1						
)ibromochloromethane	ND	0.0100	mg/Kg	1						
Dibromomethane	ND	0.0100	mg/Kg	1						
Dichlorodifluoromethane	ND	0.0500	mg/Kg	1						
:thylbenzene	ND	0.0100	mg/Kg	1						
lexachlorobutadiene	ND	0.0500	mg/Kg	1						
Iodomethane	ND	0.0500	mg/Kg	1						
'sopropylbenzene	ND	0.0100	mg/Kg	1						
ı,p-Xylene	ND	0.0100	mg/Kg	1						
Methyl tert-butyl ether	ND	0.00500	mg/Kg	1						
Methylene chloride	ND	0.0500	mg/Kg	1						
.-Butylbenzene	ND	0.0100	mg/Kg	1						
..-Propylbenzene	ND	0.0100	mg/Kg	1						
Naphthalene	ND	0.0500	mg/Kg	1						
-Xylene	ND	0.0100	mg/Kg	1						
ec-Butylbenzene	ND	0.0100	mg/Kg	1						
Styrene	ND	0.0100	mg/Kg	1						
tert-Butylbenzene	ND	0.0100	mg/Kg	1						
'etrachloroethene	ND	0.0100	mg/Kg	1						
ıoluene	ND	0.0100	mg/Kg	1						
trans-1,2-Dichloroethene	ND	0.0100	mg/Kg	1						
'ans-1,3-Dichloropropene	ND	0.0100	mg/Kg	1						
'ans-1,4-Dichloro-2-butene	ND	0.0500	mg/Kg	1						
Trichloroethene	ND	0.0100	mg/Kg	1						
Trichlorofluoromethane	ND	0.0100	mg/Kg	1						
'inyl acetate	ND	0.0500	mg/Kg	1						
Vinyl chloride	ND	0.0500	mg/Kg	1						
Surr: 1,2-Dichloroethane-d4	120	58-180	%REC	1						
Surr: 4-Bromofluorobenzene	106	69-173	%REC	1						
Surr: Dibromofluoromethane	100	71-142	%REC	1						
Surr: Toluene-d8	97.7	87-126	%REC	1						

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

* - Value exceeds Maximum Contaminant Level

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

Oceanic Analytical Laboratory, Inc.

Date: *Nov 25, 2003*

Client:	Edward K. Noda & Associates	**Client Sample ID:**	N10-1.0
Lab Order:	0311087	**Tag Number:**	
Project:	Upgrade Electrical System, Phase 1, Hickam AFB	**Collection Date:**	11/12/2003 10:04
Lab ID:	0311087-05A	**Matrix:**	SOIL

Analyses	Result	Reporting Limit	Units	Dilution Factor	Date Prepared	Date Analyzed	Batch ID	Analyst	Qual	Notes
ICP METALS, TCLP LEACHED			SW1311/6010B							
Arsenic	ND	0.500	mg/L	1	11/21/2003	11/21/2003	8417	TKL		
Barium	ND	1.00	mg/L	1						
Cadmium	ND	0.0500	mg/L	1						
Chromium	ND	0.100	mg/L	1						
Lead	ND	0.200	mg/L	1						
Selenium	ND	0.500	mg/L	1						
Silver	ND	0.200	mg/L	1						
ICP METALS-RCRA, TOTAL			SW6010B							
Arsenic	ND	5.00	mg/Kg	1	11/18/2003	11/19/2003	8383	CLS		
Cadmium	ND	2.00	mg/Kg	1						
Chromium	*212*	5.00	mg/Kg	1						
Lead	ND	20.0	mg/Kg	1						
MERCURY, TCLP LEACHED			SW1311/7470							
Mercury	ND	0.00250	mg/L	1	11/21/2003	11/21/2003	8419	SYL		
PAH BY EPA 8270 SIM			SW8270C							
Acenaphthene	ND	0.00667	mg/Kg	1	11/17/2003	11/23/2003	8367	SLK		
Benzo(a)pyrene	ND	0.00667	mg/Kg	1						
Fluoranthene	ND	0.00667	mg/Kg	1						
Naphthalene	ND	0.00667	mg/Kg	1						
Surr: 2-Fluorobiphenyl	42.1	30-115	%REC	1						
Surr: 4-Terphenyl-d14	42.0	18-137	%REC	1						A02
Surr: Nitrobenzene-d5	42.6	23-120	%REC	1						
PCBS IN SOIL OR SOLID WASTE			SW8082							
Aroclor 1016	ND	0.0333	mg/Kg	1	11/18/2003	11/19/2003	8378	SLK		
Aroclor 1221	ND	0.0667	mg/Kg	1						
Aroclor 1232	ND	0.0333	mg/Kg	1						
Aroclor 1242	ND	0.0333	mg/Kg	1						
Aroclor 1248	ND	0.0333	mg/Kg	1						
Aroclor 1254	ND	0.0333	mg/Kg	1						
Aroclor 1260	ND	0.0333	mg/Kg	1						
Surr: Decachlorobiphenyl	123	24-154	%REC	1						A01

Qualifiers:

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- * - Value exceeds Maximum Contaminant Level
- S - Spike Recovery outside accepted recovery limits
- R - RPD outside accepted recovery limits
- E - Value above quantitation range

Uceanic Analytical Laboratory, Inc.

Date: *Nov 25, 2003*

lient:	Edward K. Noda & Associates	Client Sample ID:	N10-1.0
Lab Order:	0311087	Tag Number:	
Project:	Upgrade Electrical System, Phase 1, Hickam AFB	Collection Date:	11/12/2003 10:04
ab ID:	0311087-05A	Matrix:	SOIL

nalyses	Result	Reporting Limit	Units	Dilution Factor	Date Prepared	Date Analyzed	Batch ID	Analyst	Qual	Notes
PH (FUEL FINGERPRINT)			**SW8015M**							
TPH (Diesel)	ND	5.00	mg/Kg	1	11/17/2003	11/18/2003	8368	MDH		
TPH (Jet A)	ND	5.00	mg/Kg	1						
PH (JP-4)	ND	5.00	mg/Kg	1						
PH (JP-5)	ND	5.00	mg/Kg	1						
TPH (Kerosene)	ND	5.00	mg/Kg	1						
PH (Motor Oil)	ND	20.0	mg/Kg	1						
PH (Paint Thinner)	ND	5.00	mg/Kg	1						
TPH (Unidentifed Hydrocarbons as Diesel)	ND	5.00	mg/Kg	1						
PH (Unidentifed Hydrocarbons as Aotor Oil)	ND	20.0	mg/Kg	1						
Surr: Pentacosane	71.6	31-152	%REC	1						

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

* - Value exceeds Maximum Contaminant Level

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

Oceanic Analytical Laboratory, Inc.

Date: *Nov 25, 2003*

Client:	Edward K. Noda & Associates	**Client Sample ID:**	N10-1.0
Lab Order:	0311087	**Tag Number:**	
Project:	Upgrade Electrical System, Phase 1, Hickam AFB	**Collection Date:**	11/12/2003 10:04
Lab ID:	0311087-05B	**Matrix:**	SOIL

Analyses	Result	Reporting Limit	Units	Dilution Factor	Date Prepared	Date Analyzed	Batch ID	Analyst	Qual	Notes
TPH GASOLINE W/BTEX			**SW5030/8015M/8021B**							
Benzene	ND	0.0100	mg/Kg	1	11/20/2003	11/20/2003	R22356	SJR		
Ethylbenzene	ND	0.0100	mg/Kg	1						
m,p-Xylene	ND	0.0200	mg/Kg	1						
o-Xylene	ND	0.0100	mg/Kg	1						
Toluene	ND	0.0100	mg/Kg	1						
TPH (Gasoline C6-C12)	ND	1.00	mg/Kg	1						
Surr: a,a,a-Trifluorotoluene	88.5	54-126	%REC	1						

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

* - Value exceeds Maximum Contaminant Level

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

Oceanic Analytical Laboratory, Inc.

Date: *Nov 25, 2003*

ient:	Edward K. Noda & Associates	**Client Sample ID:**	N10-1.0
Lab Order:	0311087	**Tag Number:**	
Project:	Upgrade Electrical System, Phase 1, Hickam AFB	**Collection Date:**	11/12/2003 10:04
ıb ID:	0311087-05B	**Matrix:**	SOIL

alyses	Result	Reporting Limit	Units	Dilution Factor	Date Prepared	Date Analyzed	Batch ID	Analyst	Qual	Notes
)LATILES BY GC/MS			**SW8260B**							
1,1,1,2-Tetrachloroethane	ND	0.0100	mg/Kg	1	11/20/2003	11/20/2003	R22373	KAL		
1,1,1-Trichloroethane	ND	0.0100	mg/Kg	1						
1,2,2-Tetrachloroethane	ND	0.0100	mg/Kg	1						
,1,2-Trichloroethane	ND	0.0100	mg/Kg	1						
1,1-Dichloroethane	ND	0.0500	mg/Kg	1						
1-Dichloroethene	ND	0.0100	mg/Kg	1						
1-Dichloropropene	ND	0.0100	mg/Kg	1						
1,2,3-Trichlorobenzene	ND	0.0100	mg/Kg	1						
2,3-Trichloropropane	ND	0.0100	mg/Kg	1						
2,4-Trichlorobenzene	ND	0.0500	mg/Kg	1						
,2,4-Trimethylbenzene	ND	0.0100	mg/Kg	1						
1,2-Dibromo-3-chloropropane	ND	0.0100	mg/Kg	1						
2-Dibromoethane	ND	0.0100	mg/Kg	1						
2-Dichlorobenzene	ND	0.0500	mg/Kg	1						
1,2-Dichloroethane	ND	0.0100	mg/Kg	1						
2-Dichloropropane	ND	0.0100	mg/Kg	1						
3,5-Trimethylbenzene	ND	0.0100	mg/Kg	1						
1,3-Dichlorobenzene	ND	0.0500	mg/Kg	1						
1,3-Dichloropropane	ND	0.0100	mg/Kg	1						
4-Dichlorobenzene	ND	0.0500	mg/Kg	1						
,2-Dichloropropane	ND	0.0100	mg/Kg	1						
2-Butanone	ND	0.0500	mg/Kg	1						
Chlorotoluene	ND	0.0100	mg/Kg	1						
Hexanone	ND	0.0500	mg/Kg	1						
4-Chlorotoluene	ND	0.0100	mg/Kg	1						
4-Isopropyltoluene	ND	0.0100	mg/Kg	1						
Methyl-2-pentanone	ND	0.0500	mg/Kg	1						
Acetone	ND	0.0500	mg/Kg	1						
Acrylonitrile	ND	0.0500	mg/Kg	1						
nzene	ND	0.0100	mg/Kg	1						
omobenzene	ND	0.0100	mg/Kg	1						
Bromochloromethane	ND	0.0500	mg/Kg	1						
omodichloromethane	ND	0.0100	mg/Kg	1						
omoform	ND	0.0100	mg/Kg	1						
Bromomethane	ND	0.100	mg/Kg	1						
Carbon disulfide	ND	0.0100	mg/Kg	1						
rbon tetrachloride	ND	0.0100	mg/Kg	1						
Chlorobenzene	ND	0.0100	mg/Kg	1						
Chloroethane	ND	0.0500	mg/Kg	1						
loroform	ND	0.0100	mg/Kg	1						

Qualifiers:

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
* - Value exceeds Maximum Contaminant Level
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range

Oceanic Analytical Laboratory, Inc.

Date: *Nov 25, 2003*

Client: Edward K. Noda & Associates
Lab Order: 0311087
Project: Upgrade Electrical System, Phase 1, Hickam AFB
Lab ID: 0311087-05B

Client Sample ID: N10-1.0
Tag Number:
Collection Date: 11/12/2003 10:04
Matrix: SOIL

Analyses	Result	Reporting Limit	Units	Dilution Factor	Date Prepared	Date Analyzed	Batch ID	Analyst	Qual	Notes
Chloromethane	ND	0.0500	mg/Kg	1						
cis-1,2-Dichloroethene	ND	0.0100	mg/Kg	1						
cis-1,3-Dichloropropene	ND	0.0100	mg/Kg	1						
Dibromochloromethane	ND	0.0100	mg/Kg	1						
Dibromomethane	ND	0.0100	mg/Kg	1						
Dichlorodifluoromethane	ND	0.0500	mg/Kg	1						
Ethylbenzene	ND	0.0100	mg/Kg	1						
Hexachlorobutadiene	ND	0.0500	mg/Kg	1						
Iodomethane	ND	0.0500	mg/Kg	1						
Isopropylbenzene	ND	0.0100	mg/Kg	1						
m,p-Xylene	ND	0.0100	mg/Kg	1						
Methyl tert-butyl ether	ND	0.00500	mg/Kg	1						
Methylene chloride	ND	0.0500	mg/Kg	1						
n-Butylbenzene	ND	0.0100	mg/Kg	1						
n-Propylbenzene	ND	0.0100	mg/Kg	1						
Naphthalene	ND	0.0500	mg/Kg	1						
o-Xylene	ND	0.0100	mg/Kg	1						
sec-Butylbenzene	ND	0.0100	mg/Kg	1						
Styrene	ND	0.0100	mg/Kg	1						
tert-Butylbenzene	ND	0.0100	mg/Kg	1						
Tetrachloroethene	ND	0.0100	mg/Kg	1						
Toluene	ND	0.0100	mg/Kg	1						
trans-1,2-Dichloroethene	ND	0.0100	mg/Kg	1						
trans-1,3-Dichloropropene	ND	0.0100	mg/Kg	1						
trans-1,4-Dichloro-2-butene	ND	0.0500	mg/Kg	1						
Trichloroethene	ND	0.0100	mg/Kg	1						
Trichlorofluoromethane	ND	0.0100	mg/Kg	1						
Vinyl acetate	ND	0.0500	mg/Kg	1						
Vinyl chloride	ND	0.0500	mg/Kg	1						
Surr: 1,2-Dichloroethane-d4	112	58-180	%REC	1						
Surr: 4-Bromofluorobenzene	131	69-173	%REC	1						
Surr: Dibromofluoromethane	106	71-142	%REC	1						
Surr: Toluene-d8	112	87-126	%REC	1						

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S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range

Oceanic Analytical Laboratory, Inc.

Date: *Nov 25, 2003*

lient:	Edward K. Noda & Associates	**Client Sample ID:**	N10-3.0
Lab Order:	0311087	**Tag Number:**	
Project:	Upgrade Electrical System, Phase 1, Hickam AFB	**Collection Date:**	11/12/2003 10:17
ab ID:	0311087-06A	**Matrix:**	SOIL

nalyses	Result	Reporting Limit	Units	Dilution Factor	Date Prepared	Date Analyzed	Batch ID	Analyst	Qual	Notes
CP METALS, TCLP LEACHED			**SW1311/6010B**							
Arsenic	ND	0.500	mg/L	1	11/21/2003	11/22/2003	8417	TKL		
Barium	ND	1.00	mg/L	1						
Cadmium	ND	0.0500	mg/L	1						
Chromium	ND	0.100	mg/L	1						
Lead	ND	0.200	mg/L	1						
Selenium	ND	0.500	mg/L	1						
Silver	ND	0.200	mg/L	1						
ICP METALS-RCRA, TOTAL			**SW6010B**							
Arsenic	ND	5.00	mg/Kg	1	11/18/2003	11/19/2003	8383	CLS		
Cadmium	ND	2.00	mg/Kg	1						
Chromium	***81.5***	5.00	mg/Kg	1						
Lead	ND	20.0	mg/Kg	1						
ERCURY, TCLP LEACHED			**SW1311/7470**							
Mercury	ND	0.00250	mg/L	1	11/21/2003	11/21/2003	8419	SYL		
AH BY EPA 8270 SIM			**SW8270C**							
Acenaphthene	ND	0.00667	mg/Kg	1	11/17/2003	11/23/2003	8367	SLK		
Benzo(a)pyrene	ND	0.00667	mg/Kg	1						
Fluoranthene	ND	0.00667	mg/Kg	1						
Naphthalene	ND	0.00667	mg/Kg	1						
Surr: 2-Fluorobiphenyl	37.1	30-115	%REC	1						
Surr: 4-Terphenyl-d14	41.2	18-137	%REC	1						A02
Surr: Nitrobenzene-d5	36.8	23-120	%REC	1						
PCBS IN SOIL OR SOLID WASTE			**SW8082**							
Aroclor 1016	ND	0.0333	mg/Kg	1	11/18/2003	11/19/2003	8378	SLK		
Aroclor 1221	ND	0.0667	mg/Kg	1						
Aroclor 1232	ND	0.0333	mg/Kg	1						
Aroclor 1242	ND	0.0333	mg/Kg	1						
Aroclor 1248	ND	0.0333	mg/Kg	1						
Aroclor 1254	ND	0.0333	mg/Kg	1						
Aroclor 1260	ND	0.0333	mg/Kg	1						
Surr: Decachlorobiphenyl	118	24-154	%REC	1						A01

Qualifiers:

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
* - Value exceeds Maximum Contaminant Level
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range

Oceanic Analytical Laboratory, Inc.

Date: *Nov 25, 2003*

Client:	Edward K. Noda & Associates	**Client Sample ID:**	N10-3.0
Lab Order:	0311087	**Tag Number:**	
Project:	Upgrade Electrical System, Phase 1, Hickam AFB	**Collection Date:**	11/12/2003 10:17
Lab ID:	0311087-06A	**Matrix:**	SOIL

Analyses	Result	Reporting Limit	Units	Dilution Factor	Date Prepared	Date Analyzed	Batch ID	Analyst	Qual	Notes
TPH (FUEL FINGERPRINT)			**SW8015M**							
TPH (Diesel)	ND	5.00	mg/Kg	1	11/17/2003	11/18/2003	8368	MDH		
TPH (Jet A)	ND	5.00	mg/Kg	1						
TPH (JP-4)	ND	5.00	mg/Kg	1						
TPH (JP-5)	ND	5.00	mg/Kg	1						
TPH (Kerosene)	ND	5.00	mg/Kg	1						
TPH (Motor Oil)	ND	20.0	mg/Kg	1						
TPH (Paint Thinner)	ND	5.00	mg/Kg	1						
TPH (Unidentifed Hydrocarbons as Diesel)	ND	5.00	mg/Kg	1						
TPH (Unidentifed Hydrocarbons as Motor Oil)	ND	20.0	mg/Kg	1						
Surr: Pentacosane	72.8	31-152	%REC	1						

Qualifiers:

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J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

* - Value exceeds Maximum Contaminant Level

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

Uceanic Analytical Laboratory, Inc.

Date: *Nov 25, 2003*

lient:	Edward K. Noda & Associates	Client Sample ID:	N10-3.0
Lab Order:	0311087	Tag Number:	
Project:	Upgrade Electrical System, Phase 1, Hickam AFB	Collection Date:	11/12/2003 10:17
ıb ID:	0311087-06B	Matrix:	SOIL

·ıalyses	Result	Reporting Limit	Units	Dilution Factor	Date Prepared	Date Analyzed	Batch ID	Analyst	Qual	Notes
ᵓH GASOLINE W/BTEX				**SW5030/8015M/8021B**						
Benzene	ND	0.0100	mg/Kg	1	11/20/2003	11/20/2003	R22356	SJR		
Ethylbenzene	ND	0.0100	mg/Kg	1						
ı,p-Xylene	ND	0.0200	mg/Kg	1						
ˍ-Xylene	ND	0.0100	mg/Kg	1						
Toluene	ND	0.0100	mg/Kg	1						
PH (Gasoline C6-C12)	ND	1.00	mg/Kg	1						
Surr: a,a,a-Trifluorotoluene	93.3	54-126	%REC	1						

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

* - Value exceeds Maximum Contaminant Level

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

Oceanic Analytical Laboratory, Inc.

Date: *Nov 25, 2003*

Client:	Edward K. Noda & Associates	**Client Sample ID:**	N10-3.0
Lab Order:	0311087	**Tag Number:**	
Project:	Upgrade Electrical System, Phase 1, Hickam AFB	**Collection Date:**	11/12/2003 10:17
Lab ID:	0311087-06B	**Matrix:**	SOIL

Analyses	Result	Reporting Limit	Units	Dilution Factor	Date Prepared	Date Analyzed	Batch ID	Analyst	Qual	Notes
VOLATILES BY GC/MS			**SW8260B**							
1,1,1,2-Tetrachloroethane	ND	0.0100	mg/Kg	1	11/20/2003	11/20/2003	R22373	KAL		
1,1,1-Trichloroethane	ND	0.0100	mg/Kg	1						
1,1,2,2-Tetrachloroethane	ND	0.0100	mg/Kg	1						
1,1,2-Trichloroethane	ND	0.0100	mg/Kg	1						
1,1-Dichloroethane	ND	0.0500	mg/Kg	1						
1,1-Dichloroethene	ND	0.0100	mg/Kg	1						
1,1-Dichloropropene	ND	0.0100	mg/Kg	1						
1,2,3-Trichlorobenzene	ND	0.0100	mg/Kg	1						
1,2,3-Trichloropropane	ND	0.0100	mg/Kg	1						
1,2,4-Trichlorobenzene	ND	0.0500	mg/Kg	1						
1,2,4-Trimethylbenzene	ND	0.0100	mg/Kg	1						
1,2-Dibromo-3-chloropropane	ND	0.0100	mg/Kg	1						
1,2-Dibromoethane	ND	0.0100	mg/Kg	1						
1,2-Dichlorobenzene	ND	0.0500	mg/Kg	1						
1,2-Dichloroethane	ND	0.0100	mg/Kg	1						
1,2-Dichloropropane	ND	0.0100	mg/Kg	1						
1,3,5-Trimethylbenzene	ND	0.0100	mg/Kg	1						
1,3-Dichlorobenzene	ND	0.0500	mg/Kg	1						
1,3-Dichloropropane	ND	0.0100	mg/Kg	1						
1,4-Dichlorobenzene	ND	0.0500	mg/Kg	1						
2,2-Dichloropropane	ND	0.0100	mg/Kg	1						
2-Butanone	ND	0.0500	mg/Kg	1						
2-Chlorotoluene	ND	0.0100	mg/Kg	1						
2-Hexanone	ND	0.0500	mg/Kg	1						
4-Chlorotoluene	ND	0.0100	mg/Kg	1						
4-Isopropyltoluene	ND	0.0100	mg/Kg	1						
4-Methyl-2-pentanone	ND	0.0500	mg/Kg	1						
Acetone	ND	0.0500	mg/Kg	1						
Acrylonitrile	ND	0.0500	mg/Kg	1						
Benzene	ND	0.0100	mg/Kg	1						
Bromobenzene	ND	0.0100	mg/Kg	1						
Bromochloromethane	ND	0.0500	mg/Kg	1						
Bromodichloromethane	ND	0.0100	mg/Kg	1						
Bromoform	ND	0.0100	mg/Kg	1						
Bromomethane	ND	0.100	mg/Kg	1						
Carbon disulfide	ND	0.0100	mg/Kg	1						
Carbon tetrachloride	ND	0.0100	mg/Kg	1						
Chlorobenzene	ND	0.0100	mg/Kg	1						
Chloroethane	ND	0.0500	mg/Kg	1						
Chloroform	ND	0.0100	mg/Kg	1						

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

* - Value exceeds Maximum Contaminant Level

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

Oceanic Analytical Laboratory, Inc.

Date: *Nov 25, 2003*

(ient:	Edward K. Noda & Associates	**Client Sample ID:**	N10-3.0
Lab Order:	0311087	**Tag Number:**	
P⁻oject:	Upgrade Electrical System, Phase 1, Hickam AFB	**Collection Date:**	11/12/2003 10:17
I b ID:	0311087-06B	**Matrix:**	SOIL

alyses	Result	Reporting Limit	Units	Dilution Factor	Date Prepared	Date Analyzed	Batch ID	Analyst	Qual	Notes
ıloromethane	ND	0.0500	mg/Kg	1						
cis-1,2-Dichloroethene	ND	0.0100	mg/Kg	1						
ᶜis-1,3-Dichloropropene	ND	0.0100	mg/Kg	1						
bromochloromethane	ND	0.0100	mg/Kg	1						
ᴜibromomethane	ND	0.0100	mg/Kg	1						
Dichlorodifluoromethane	ND	0.0500	mg/Kg	1						
hylbenzene	ND	0.0100	mg/Kg	1						
›xachlorobutadiene	ND	0.0500	mg/Kg	1						
Iodomethane	ND	0.0500	mg/Kg	1						
›propylbenzene	ND	0.0100	mg/Kg	1						
p-Xylene	ND	0.0100	mg/Kg	1						
Methyl tert-butyl ether	ND	0.00500	mg/Kg	1						
Methylene chloride	ND	0.0500	mg/Kg	1						
3utylbenzene	ND	0.0100	mg/Kg	1						
ᴾropylbenzene	ND	0.0100	mg/Kg	1						
Naphthalene	ND	0.0500	mg/Kg	1						
‹ylene	ND	0.0100	mg/Kg	1						
c-Butylbenzene	ND	0.0100	mg/Kg	1						
Styrene	ND	0.0100	mg/Kg	1						
tert-Butylbenzene	ND	0.0100	mg/Kg	1						
trachloroethene	ND	0.0100	mg/Kg	1						
ı oluene	ND	0.0100	mg/Kg	1						
trans-1,2-Dichloroethene	ND	0.0100	mg/Kg	1						
ns-1,3-Dichloropropene	ND	0.0100	mg/Kg	1						
ns-1,4-Dichloro-2-butene	ND	0.0500	mg/Kg	1						
Trichloroethene	ND	0.0100	mg/Kg	1						
ᵀ⁻chlorofluoromethane	ND	0.0100	mg/Kg	1						
ıyl acetate	ND	0.0500	mg/Kg	1						
Vinyl chloride	ND	0.0500	mg/Kg	1						
Surr: 1,2-Dichloroethane-d4	99.9	58-180	%REC	1						
Surr: 4-Bromofluorobenzene	113	69-173	%REC	1						
Surr: Dibromofluoromethane	98.4	71-142	%REC	1						
Surr: Toluene-d8	97.8	87-126	%REC	1						

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

* - Value exceeds Maximum Contaminant Level

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

Oceanic Analytical Laboratory, Inc. Date: *Nov 25, 2003*

Client:	Edward K. Noda & Associates
Lab Order:	0311087
Project:	Upgrade Electrical System, Phase 1, Hickam AF

QC SUMMARY REPORT

Method Blank

Sample ID: **MB-8419** Batch ID: **8419** Test Code: **SW1311/7470** Prep Date: **11/21/2003** Units: **mg/L**
Client ID: Run ID: **MERC_031121A** Analysis Date: **11/21/2003** Notes:

Analyte	Result	PQL	DF	Spike Value	Spike Ref Val	%REC	%REC Limits	RPD Ref Val	RPD	RPD Limit	Qual	Note
Mercury	ND	0.0025	1									

Sample ID: **MB-8417** Batch ID: **8417** Test Code: **SW1311/6010B** Prep Date: **11/21/2003** Units: **mg/L**
Client ID: Run ID: **ICP1_031121D** Analysis Date: **11/21/2003** Notes:

Analyte	Result	PQL	DF	Spike Value	Spike Ref Val	%REC	%REC Limits	RPD Ref Val	RPD	RPD Limit	Qual	Note
Arsenic	ND	0.50	1									
Barium	0.06592	1.0	1								J	
Cadmium	ND	0.050	1									
Chromium	ND	0.10	1									
Lead	0.01696	0.20	1								J	
Selenium	ND	0.50	1									
Silver	ND	0.20	1									

Sample ID: **MB-8378** Batch ID: **8378** Test Code: **SW8082** Prep Date: **11/18/2003** Units: **mg/Kg**
Client ID: Run ID: **GC1A_031119A** Analysis Date: **11/19/2003** Notes:

Analyte	Result	PQL	DF	Spike Value	Spike Ref Val	%REC	%REC Limits	RPD Ref Val	RPD	RPD Limit	Qual	Note
Aroclor 1016	ND	0.033	1									
Aroclor 1221	ND	0.067	1									
Aroclor 1232	ND	0.033	1									
Aroclor 1242	ND	0.033	1									
Aroclor 1248	ND	0.033	1									
Aroclor 1254	ND	0.033	1									
Aroclor 1260	ND	0.033	1									
Surr: Decachlorobiphenyl	0.04183	0	1	0.03333	0	125	24 154	0				A01

Qualifiers:

- ND - Not Detected at the Reporting Limit
- J - Analyte detected below quantitation limits
- B - Analyte detected in the associated Method Blank
- %REC - % Recovery
- S - Spike Recovery outside established recovery limits
- R - RPD outside established recovery limits
- DF - Dilution Factor
- RPD - Relative Percent Difference

Oceanic Analytical Laboratory, Inc.

Date: *Nov 25, 2003*

(ient: Edward K. Noda & Associates
Lab Order: 0311087
P"oject: Upgrade Electrical System, Phase 1, Hickam AF

QC SUMMARY REPORT
Method Blank

Sample ID: **MBLKs111403** Batch ID: **R22260** Test Code: **SW8260B** Prep Date: **11/14/2003** Units: **mg/Kg**
C ent ID: Run ID: **MSD1_031114B** Analysis Date: **11/14/2003** Notes:

Analyte	Result	PQL	DF	Spike Value	Spike Ref Val	%REC	%REC Limits	RPD Ref Val	RPD	RPD Limit	Qual	Note
1 ,1,2-Tetrachloroethane	0.00056	0.010	1								J	
1 ,1-Trichloroethane	ND	0.010	1									
1,1,2,2-Tetrachloroethane	ND	0.010	1									
1 ',2-Trichloroethane	ND	0.010	1									
1 -Dichloroethane	ND	0.050	1									
1,1-Dichloroethene	ND	0.010	1									
1,1-Dichloropropene	ND	0.010	1									
1 ,3-Trichlorobenzene	0.00642	0.010	1								J	
1,_,3-Trichloropropane	0.00156	0.010	1								J	
1,2,4-Trichlorobenzene	0.00078	0.050	1								J	
1 4-Trimethylbenzene	0.00304	0.010	1								J	
1 -Dibromo-3-chloropropane	ND	0.010	1									
1,2-Dibromoethane	ND	0.010	1									
1 ?-Dichlorobenzene	0.0007	0.050	1								J	
1 Dichloroethane	ND	0.010	1									
1,2-Dichloropropane	ND	0.010	1									
1,3,5-Trimethylbenzene	0.00132	0.010	1								J	
1 Dichlorobenzene	0.00068	0.050	1								J	
1 Dichloropropane	ND	0.010	1									
1,4-Dichlorobenzene	0.00086	0.050	1								J	
2 ^ Dichloropropane	ND	0.010	1									
2 utanone	0.01326	0.050	1								J	
2-Chlorotoluene	0.00058	0.010	1								J	
2-Hexanone	0.00132	0.050	1								J	
4 hlorotoluene	0.00066	0.010	1								J	
4 .opropyltoluene	ND	0.010	1									
4-Methyl-2-pentanone	0.0025	0.050	1								J	
A tone	0.01248	0.050	1								J	
A /lonitrile	ND	0.050	1									
Benzene	ND	0.010	1									
B--mobenzene	ND	0.010	1									
B nochloromethane	ND	0.050	1									
Bromodichloromethane	ND	0.010	1									
Bromoform	ND	0.010	1									
B nomethane	0.00408	0.10	1								J	
C_.bon disulfide	ND	0.010	1									
Carbon tetrachloride	ND	0.010	1									
C orobenzene	ND	0.010	1									

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
%REC - % Recovery
S - Spike Recovery outside established recovery limits
R - RPD outside established recovery limits
DF - Dilution Factor
RPD - Relative Percent Difference

Oceanic Analytical Laboratory, Inc.

Date: *Nov 25, 2003*

Client: Edward K. Noda & Associates
Lab Order: 0311087
Project: Upgrade Electrical System, Phase 1, Hickam AF

QC SUMMARY REPORT
Method Blank

Chloroethane	ND	0.050	1							
Chloroform	ND	0.010	1							
Chloromethane	0.00072	0.050	1							J
cis-1,2-Dichloroethene	ND	0.010	1							
cis-1,3-Dichloropropene	ND	0.010	1							
Dibromochloromethane	ND	0.010	1							
Dibromomethane	ND	0.010	1							
Dichlorodifluoromethane	ND	0.050	1							
Ethylbenzene	ND	0.010	1							
Hexachlorobutadiene	ND	0.050	1							
Iodomethane	ND	0.050	1							
Isopropylbenzene	ND	0.010	1							
m,p-Xylene	ND	0.010	1							
Methyl tert-butyl ether	ND	0.0050	1							
Methylene chloride	0.00574	0.050	1							J
n-Butylbenzene	0.00056	0.010	1							J
n-Propylbenzene	ND	0.010	1							
Naphthalene	0.00594	0.050	1							J
o-Xylene	ND	0.010	1							
sec-Butylbenzene	ND	0.010	1							
Styrene	ND	0.010	1							
tert-Butylbenzene	ND	0.010	1							
Tetrachloroethene	ND	0.010	1							
Toluene	ND	0.010	1							
trans-1,2-Dichloroethene	ND	0.010	1							
trans-1,3-Dichloropropene	ND	0.010	1							
trans-1,4-Dichloro-2-butene	ND	0.050	1							
Trichloroethene	ND	0.010	1							
Trichlorofluoromethane	ND	0.010	1							
Vinyl acetate	ND	0.050	1							
Vinyl chloride	ND	0.050	1							
Surr: 1,2-Dichloroethane-d4	0.1142	0	1	0.1	0	114	58	180	0	
Surr: 4-Bromofluorobenzene	0.0988	0	1	0.1	0	98.8	69	173	0	
Surr: Dibromofluoromethane	0.1041	0	1	0.1	0	104	71	142	0	
Surr: Toluene-d8	0.0934	0	1	0.1	0	93.4	87	126	0	

Qualifiers:

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
%REC - % Recovery
S - Spike Recovery outside established recovery limits
R - RPD outside established recovery limits
DF - Dilution Factor
RPD - Relative Percent Difference

Oceanic Analytical Laboratory, Inc.

Date: *Nov 25, 2003*

ient:	Edward K. Noda & Associates
Lab Order:	0311087
oject:	Upgrade Electrical System, Phase 1, Hickam AF

QC SUMMARY REPORT

Method Blank

Sample ID: **MBLKs112003** Batch ID: **R22373** Test Code: **SW8260B** Prep Date: **11/20/2003** Units: **mg/Kg**

ent ID: Run ID: **MSD1_031120A** Analysis Date: **11/20/2003** Notes:

Analyte	Result	PQL	DF	Spike Value	Spike Ref Val	%REC	%REC Limits	RPD Ref Val	RPD	RPD Limit	Qual	Note
,1,2-Tetrachloroethane	ND	0.010	1									
,1-Trichloroethane	ND	0.010	1									
1,1,2,2-Tetrachloroethane	ND	0.010	1									
,2-Trichloroethane	ND	0.010	1									
-Dichloroethane	ND	0.050	1									
1,1-Dichloroethene	ND	0.010	1									
1-Dichloropropene	ND	0.010	1									
,3-Trichlorobenzene	0.00588	0.010	1								J	
,2,3-Trichloropropane	0.00188	0.010	1								J	
1,2,4-Trichlorobenzene	ND	0.050	1									
,4-Trimethylbenzene	0.00268	0.010	1								J	
-Dibromo-3-chloropropane	ND	0.010	1									
1,2-Dibromoethane	ND	0.010	1									
2-Dichlorobenzene	ND	0.050	1									
-Dichloroethane	ND	0.010	1									
1,2-Dichloropropane	ND	0.010	1									
1,3,5-Trimethylbenzene	0.0011	0.010	1								J	
3-Dichlorobenzene	ND	0.050	1									
,3-Dichloropropane	ND	0.010	1									
1,4-Dichlorobenzene	ND	0.050	1									
-Dichloropropane	ND	0.010	1									
Butanone	0.01282	0.050	1								J	
2-Chlorotoluene	ND	0.010	1									
2-Hexanone	0.00056	0.050	1								J	
Chlorotoluene	ND	0.010	1									
4-Isopropyltoluene	ND	0.010	1									
4-Methyl-2-pentanone	0.0025	0.050	1								J	
etone	0.0124	0.050	1								J	
rylonitrile	ND	0.050	1									
Benzene	ND	0.010	1									
omobenzene	ND	0.010	1									
omochloromethane	ND	0.050	1									
Bromodichloromethane	ND	0.010	1									
Bromoform	ND	0.010	1									
omomethane	0.0026	0.10	1								J	
Carbon disulfide	ND	0.010	1									
Carbon tetrachloride	ND	0.010	1									
lorobenzene	ND	0.010	1									

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

%REC - % Recovery

S - Spike Recovery outside established recovery limits

R - RPD outside established recovery limits

DF - Dilution Factor

RPD - Relative Percent Difference

Oceanic Analytical Laboratory, Inc.

Date: *Nov 25, 2003*

Client: Edward K. Noda & Associates
Lab Order: 0311087
Project: Upgrade Electrical System, Phase 1, Hickam AF

QC SUMMARY REPORT
Method Blank

Chloroethane	ND	0.050	1							
Chloroform	ND	0.010	1							
Chloromethane	ND	0.050	1							
cis-1,2-Dichloroethene	ND	0.010	1							
cis-1,3-Dichloropropene	ND	0.010	1							
Dibromochloromethane	ND	0.010	1							
Dibromomethane	ND	0.010	1							
Dichlorodifluoromethane	ND	0.050	1							
Ethylbenzene	ND	0.010	1							
Hexachlorobutadiene	ND	0.050	1							
Iodomethane	ND	0.050	1							
Isopropylbenzene	ND	0.010	1							
m,p-Xylene	ND	0.010	1							
Methyl tert-butyl ether	ND	0.0050	1							
Methylene chloride	0.00524	0.050	1							J
n-Butylbenzene	ND	0.010	1							
n-Propylbenzene	ND	0.010	1							
Naphthalene	0.00472	0.050	1							J
o-Xylene	ND	0.010	1							
sec-Butylbenzene	ND	0.010	1							
Styrene	ND	0.010	1							
tert-Butylbenzene	ND	0.010	1							
Tetrachloroethene	ND	0.010	1							
Toluene	ND	0.010	1							
trans-1,2-Dichloroethene	ND	0.010	1							
trans-1,3-Dichloropropene	ND	0.010	1							
trans-1,4-Dichloro-2-butene	ND	0.050	1							
Trichloroethene	ND	0.010	1							
Trichlorofluoromethane	ND	0.010	1							
Vinyl acetate	ND	0.050	1							
Vinyl chloride	ND	0.050	1							
Surr: 1,2-Dichloroethane-d4	0.09648	0	1	0.1	0	96.5	58	180	0	
Surr: 4-Bromofluorobenzene	0.1133	0	1	0.1	0	113	69	173	0	
Surr: Dibromofluoromethane	0.09746	0	1	0.1	0	97.5	71	142	0	
Surr: Toluene-d8	0.1011	0	1	0.1	0	101	87	126	0	

Qualifiers:

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
%REC - % Recovery
S - Spike Recovery outside established recovery limits
R - RPD outside established recovery limits
DF - Dilution Factor
RPD - Relative Percent Difference

Oceanic Analytical Laboratory, Inc.

Date: *Nov 25, 2003*

ient: Edward K. Noda & Associates
Lab Order: 0311087
ᐨ oject: Upgrade Electrical System, Phase 1, Hickam AF

QC SUMMARY REPORT

Method Blank

Sample ID: **MBLK112003** Batch ID: **R22356** Test Code: **SW5030/8015M/8021B** Prep Date: **11/20/2003** Units: **mg/Kg**
ent ID: Run ID: **GC7A_031120A** Analysis Date: **11/20/2003** Notes:

Analyte	Result	PQL	DF	Spike Value	Spike Ref Val	%REC	%REC Limits	RPD Ref Val	RPD	RPD Limit	Qual	Note
'H (Gasoline C6-C12)	ND	1.0	1									
_ɔnzene	ND	0.010	1									
Ethylbenzene	ND	0.010	1									
p-Xylene	0.00147	0.020	1								J	
‹ylene	ND	0.010	1									
Toluene	0.00089	0.010	1								J	
Surr: a,a,a-Trifluorotoluene	0.292	0	1	0.3	0	97.3	54 126	0				

ɔample ID: **MB-8383** Batch ID: **8383** Test Code: **SW6010B** Prep Date: **11/18/2003** Units: **mg/Kg**
Client ID: Run ID: **ICP1_031119A** Analysis Date: **11/19/2003** Notes:

Analyte	Result	PQL	DF	Spike Value	Spike Ref Val	%REC	%REC Limits	RPD Ref Val	RPD	RPD Limit	Qual	Note
^·senic	ND	5.0	1									
dmium	ND	2.0	1									
Chromium	ND	5.0	1									
Lead	ND	20	1									

_ _mple ID: **MB-8367** Batch ID: **8367** Test Code: **SW8270C** Prep Date: **11/17/2003** Units: **mg/Kg**
Client ID: Run ID: **MSD3_031123A** Analysis Date: **11/23/2003** Notes:

Analyte	Result	PQL	DF	Spike Value	Spike Ref Val	%REC	%REC Limits	RPD Ref Val	RPD	RPD Limit	Qual	Note
Acenaphthene	0.003667	0.0067	1								J	
nzo(a)pyrene	0.003	0.0067	1								J	
ɿ.uoranthene	ND	0.0067	1									
Naphthalene	ND	0.0067	1									
Surr: 2-Fluorobiphenyl	0.862	0	1	1.67	0	51.6	30 115	0				
Surr: 4-Terphenyl-d14	0.8317	0	1	1.67	0	49.8	18 137	0				
Surr: Nitrobenzene-d5	0.8487	0	1	1.67	0	50.8	23 120	0				

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
%REC - % Recovery
S - Spike Recovery outside established recovery limits
R - RPD outside established recovery limits
DF - Dilution Factor
RPD - Relative Percent Difference

Oceanic Analytical Laboratory, Inc.

Date: *Nov 25, 2003*

Client: Edward K. Noda & Associates
Lab Order: 0311087
Project: Upgrade Electrical System, Phase 1, Hickam AF

QC SUMMARY REPORT
Method Blank

Sample ID: **MB-8368** Batch ID: **8368** Test Code: **SW8015M** Prep Date: **11/17/2003** Units: **mg/Kg**
Client ID: Run ID: **GC2B_031118A** Analysis Date: **11/18/2003** Notes:

Analyte	Result	PQL	DF	Spike Value	Spike Ref Val	%REC	%REC Limits	RPD Ref Val	RPD	RPD Limit	Qual	Note
TPH (Diesel)	ND	5.0	1									
TPH (Jet A)	ND	5.0	1									
TPH (JP-4)	ND	5.0	1									
TPH (JP-5)	ND	5.0	1									
TPH (Kerosene)	ND	5.0	1									
TPH (Motor Oil)	ND	20	1									
TPH (Paint Thinner)	ND	5.0	1									
TPH (Unidentifed Hydrocarbons as Di	ND	5.0	1									
TPH (Unidentifed Hydrocarbons as M	ND	20	1									
Surr: Pentacosane	1.26	0	1	1.67	0	75.5	31 152	0				

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
%REC - % Recovery
S - Spike Recovery outside established recovery limits
R - RPD outside established recovery limits
DF - Dilution Factor
RPD - Relative Percent Difference

Oceanic Analytical Laboratory, Inc.

Date: *Nov 25, 2003*

Client: Edward K. Noda & Associates
Lab Order: 0311087
Project: Upgrade Electrical System, Phase 1, Hickam AF

QC SUMMARY REPORT

Sample Matrix Spike

Sample ID: **0311080-01AMS** Batch ID: **8419** Test Code: **SW1311/7470** Prep Date: **11/21/2003** Units: **mg/L**
Client ID: Run ID: **MERC_031121A** Analysis Date: **11/21/2003** Notes:

Analyte	Result	PQL	DF	Spike Value	Spike Ref Val	%REC	%REC Limits	RPD Ref Val	RPD	RPD Limit	Qual	Note
Mercury	0.0105	0.0025	1	0.01	0	105	75 125	0				

Sample ID: **0311080-01AMSD** Batch ID: **8419** Test Code: **SW1311/7470** Prep Date: **11/21/2003** Units: **mg/L**
Client ID: Run ID: **MERC_031121A** Analysis Date: **11/21/2003** Notes:

Analyte	Result	PQL	DF	Spike Value	Spike Ref Val	%REC	%REC Limits	RPD Ref Val	RPD	RPD Limit	Qual	Note
Mercury	0.0104	0.0025	1	0.01	0	104	75 125	0.0105	0.957	20		

Sample ID: **0311087-01AMS** Batch ID: **8417** Test Code: **SW1311/6010B** Prep Date: **11/21/2003** Units: **mg/L**
Client ID: **N1-2.0** Run ID: **ICP1_031121D** Analysis Date: **11/21/2003** Notes:

Analyte	Result	PQL	DF	Spike Value	Spike Ref Val	%REC	%REC Limits	RPD Ref Val	RPD	RPD Limit	Qual	Note
Arsenic	1.102	0.50	1	1	0	110	80 120	0				
Barium	1.298	1.0	1	1	0.2433	105	80 120	0				
Cadmium	1.05	0.050	1	1	0	105	80 120	0			*	
Chromium	1.025	0.10	1	1	0	103	80 120	0				
Lead	1.051	0.20	1	1	0	105	80 120	0				
Selenium	1.097	0.50	1	1	0	110	80 120	0			*	
Silver	1.075	0.20	1	1	0	107	80 120	0				

Sample ID: **0311087-01AMSD** Batch ID: **8417** Test Code: **SW1311/6010B** Prep Date: **11/21/2003** Units: **mg/L**
Client ID: **N1-2.0** Run ID: **ICP1_031121D** Analysis Date: **11/21/2003** Notes:

Analyte	Result	PQL	DF	Spike Value	Spike Ref Val	%REC	%REC Limits	RPD Ref Val	RPD	RPD Limit	Qual	Note
Arsenic	1.083	0.50	1	1	0	108	80 120	1.102	1.69	20		
Barium	1.293	1.0	1	1	0.2433	105	80 120	1.298	0.355	20		
Cadmium	1.038	0.050	1	1	0	104	80 120	1.05	1.16	20	*	
Chromium	1.018	0.10	1	1	0	102	80 120	1.025	0.724	20		
Lead	1.044	0.20	1	1	0	104	80 120	1.051	0.697	20		
Selenium	1.093	0.50	1	1	0	109	80 120	1.097	0.338	20	*	
Silver	1.077	0.20	1	1	0	108	80 120	1.075	0.223	20		

Qualifiers:

- ND - Not Detected at the Reporting Limit
- J - Analyte detected below quantitation limits
- B - Analyte detected in the associated Method Blank
- %REC - % Recovery
- S - Spike Recovery outside established recovery limits
- R - RPD outside established recovery limits
- DF - Dilution Factor
- RPD - Relative Percent Difference

Oceanic Analytical Laboratory, Inc.

Date: *Nov 25, 2003*

Client: Edward K. Noda & Associates
Lab Order: 0311087
Project: Upgrade Electrical System, Phase 1, Hickam AF

QC SUMMARY REPORT

Sample Matrix Spike

Sample ID: **0311087-02AMS** Batch ID: **8378** Test Code: **SW8082** Prep Date: **11/18/2003** Units: **mg/Kg**
Client ID: **N1-5.0** Run ID: **GC1A_031119A** Analysis Date: **11/19/2003** Notes:

Analyte	Result	PQL	DF	Spike Value	Spike Ref Val	%REC	%REC Limits		RPD Ref Val	RPD	RPD Limit	Qual	Note
Aroclor 1016	0.1492	0.033	1	0.167	0	89.3	65	128	0				
Aroclor 1260	0.1767	0.033	1	0.167	0	106	63	130	0				
Surr: Decachlorobiphenyl	0.03974	0	1	0.03333	0	119	24	154	0				A01

Sample ID: **0311087-02AMSD** Batch ID: **8378** Test Code: **SW8082** Prep Date: **11/18/2003** Units: **mg/Kg**
Client ID: **N1-5.0** Run ID: **GC1A_031119A** Analysis Date: **11/19/2003** Notes:

Analyte	Result	PQL	DF	Spike Value	Spike Ref Val	%REC	%REC Limits		RPD Ref Val	RPD	RPD Limit	Qual	Note
Aroclor 1016	0.1515	0.033	1	0.167	0	90.7	65	128	0.1492	1.56	50		
Aroclor 1260	0.167	0.033	1	0.167	0	100	63	130	0.1767	5.6	50		
Surr: Decachlorobiphenyl	0.04244	0	1	0.03333	0	127	24	154	0	0	0		A01

Sample ID: **0311087-04BMS** Batch ID: **R22260** Test Code: **SW8260B** Prep Date: **11/15/2003** Units: **mg/Kg**
Client ID: **N2-5.0** Run ID: **MSD1_031114B** Analysis Date: **11/15/2003** Notes:

Analyte	Result	PQL	DF	Spike Value	Spike Ref Val	%REC	%REC Limits		RPD Ref Val	RPD	RPD Limit	Qual	Note
1,1-Dichloroethene	0.09022	0.010	1	0.1	0	90.2	56	145	0				
Benzene	0.08898	0.010	1	0.1	0	89	66	124	0				
Chlorobenzene	0.08958	0.010	1	0.1	0	89.6	73	119	0				
Methyl tert-butyl ether	0.205	0.0050	1	0.2	0	103	58	131	0				
Toluene	0.08606	0.010	1	0.1	0.00108	85	74	116	0				
Trichloroethene	0.115	0.010	1	0.1	0	115	78	127	0				
Surr: 1,2-Dichloroethane-d4	0.1122	0	1	0.1	0	112	58	180	0				
Surr: 4-Bromofluorobenzene	0.0928	0	1	0.1	0	92.8	69	173	0				
Surr: Dibromofluoromethane	0.09718	0	1	0.1	0	97.2	71	142	0				
Surr: Toluene-d8	0.09478	0	1	0.1	0	94.8	87	126	0				

Qualifiers:

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
%REC - % Recovery
S - Spike Recovery outside established recovery limits
R - RPD outside established recovery limits
DF - Dilution Factor
RPD - Relative Percent Difference

Oceanic Analytical Laboratory, Inc.

Date: *Nov 25, 2003*

:ient: Edward K. Noda & Associates
Lab Order: 0311087
·oject: Upgrade Electrical System, Phase 1, Hickam AF

QC SUMMARY REPORT
Sample Matrix Spike Duplicate

Sample ID: **0311087-04BMSD** Batch ID: **R22260** Test Code: **SW8260B** Prep Date: **11/15/2003** Units: **mg/Kg**
ent ID: **N2-5.0** Run ID: **MSD1_031114B** Analysis Date: **11/15/2003** Notes:

^nalyte	Result	PQL	DF	Spike Value	Spike Ref Val	%REC	%REC Limits		RPD Ref Val	RPD	RPD Limit	Qual	Note
1-Dichloroethene	0.08026	0.010	1	0.1	0	80.3	56	145	0.09022	11.7	25		
ɒenzene	0.08344	0.010	1	0.1	0	83.4	66	124	0.08898	6.43	25		
Chlorobenzene	0.0883	0.010	1	0.1	0	88.3	73	119	0.08958	1.44	25		
ethyl tert-butyl ether	0.174	0.0050	1	0.2	0	87	58	131	0.205	16.3	25		
ıluene	0.07786	0.010	1	0.1	0.00108	76.8	74	116	0.08606	10	25		
Trichloroethene	0.1048	0.010	1	0.1	0	105	78	127	0.115	9.24	25		
Surr: 1,2-Dichloroethane-d4	0.1072	0	1	0.1	0	107	58	180	0	0	0		
Surr: 4-Bromofluorobenzene	0.08996	0	1	0.1	0	90	69	173	0	0	0		
Surr: Dibromofluoromethane	0.08892	0	1	0.1	0	88.9	71	142	0	0	0		
Surr: Toluene-d8	0.09366	0	1	0.1	0	93.7	87	126	0	0	0		

ʖample ID: **0311088-07BMS** Batch ID: **R22373** Test Code: **SW8260B** Prep Date: **11/21/2003** Units: **mg/Kg**
Client ID: Run ID: **MSD1_031120A** Analysis Date: **11/21/2003** Notes:

Analyte	Result	PQL	DF	Spike Value	Spike Ref Val	%REC	%REC Limits		RPD Ref Val	RPD	RPD Limit	Qual	Note
1,1-Dichloroethene	0.08108	0.010	1	0.1	0	81.1	56	145	0				
ɜnzene	0.0909	0.010	1	0.1	0	90.9	66	124	0				
◡ılorobenzene	0.09162	0.010	1	0.1	0	91.6	73	119	0				
Methyl tert-butyl ether	0.1905	0.0050	1	0.2	0	95.2	58	131	0				
›luene	0.08638	0.010	1	0.1	0.0007	85.7	74	116	0				
ichloroethene	0.1146	0.010	1	0.1	0	115	78	127	0				
Surr: 1,2-Dichloroethane-d4	0.1028	0	1	0.1	0	103	58	180	0				
Surr: 4-Bromofluorobenzene	0.08998	0	1	0.1	0	90	69	173	0				
Surr: Dibromofluoromethane	0.0901	0	1	0.1	0	90.1	71	142	0				
Surr: Toluene-d8	0.09518	0	1	0.1	0	95.2	87	126	0				

Qualifiers:
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S - Spike Recovery outside established recovery limits
R - RPD outside established recovery limits
DF - Dilution Factor
RPD - Relative Percent Difference

Oceanic Analytical Laboratory, Inc.

Date: *Nov 25, 2003*

Client: Edward K. Noda & Associates
Lab Order: 0311087
Project: Upgrade Electrical System, Phase 1, Hickam AF

QC SUMMARY REPORT

Sample Matrix Spike Duplicate

Sample ID: **0311088-07BMSD** Batch ID: **R22373** Test Code: **SW8260B** Prep Date: **11/21/2003** Units: **mg/Kg**
Client ID: Run ID: **MSD1_031120A** Analysis Date: **11/21/2003** Notes:

Analyte	Result	PQL	DF	Spike Value	Spike Ref Val	%REC	%REC Limits	RPD Ref Val	RPD	RPD Limit	Qual	Note
1,1-Dichloroethene	0.08142	0.010	1	0.1	0	81.4	56 145	0.08108	0.418	25		
Benzene	0.08634	0.010	1	0.1	0	86.3	66 124	0.0909	5.15	25		
Chlorobenzene	0.0836	0.010	1	0.1	0	83.6	73 119	0.09162	9.15	25		
Methyl tert-butyl ether	0.1857	0.0050	1	0.2	0	92.8	58 131	0.1905	2.55	25		
Toluene	0.08416	0.010	1	0.1	0.0007	83.5	74 116	0.08638	2.6	25		
Trichloroethene	0.1028	0.010	1	0.1	0	103	78 127	0.1146	10.9	25		
Surr: 1,2-Dichloroethane-d4	0.09798	0	1	0.1	0	98	58 180	0	0	0		
Surr: 4-Bromofluorobenzene	0.09478	0	1	0.1	0	94.8	69 173	0	0	0		
Surr: Dibromofluoromethane	0.089	0	1	0.1	0	89	71 142	0	0	0		
Surr: Toluene-d8	0.09608	0	1	0.1	0	96.1	87 126	0	0	0		

Sample ID: **0311084-01AMS** Batch ID: **8383** Test Code: **SW6010B** Prep Date: **11/18/2003** Units: **mg/Kg**
Client ID: Run ID: **ICP1_031119A** Analysis Date: **11/19/2003** Notes:

Analyte	Result	PQL	DF	Spike Value	Spike Ref Val	%REC	%REC Limits	RPD Ref Val	RPD	RPD Limit	Qual	Note
Arsenic	93	5.0	1	100	10.02	83	80 120	0				
Cadmium	78.21	2.0	1	100	2.587	75.6	80 120	0			S	Q02
Chromium	220.6	5.0	1	100	153.9	66.6	80 120	0			S	Q02

Sample ID: **0311084-01AMSD** Batch ID: **8383** Test Code: **SW6010B** Prep Date: **11/18/2003** Units: **mg/Kg**
Client ID: Run ID: **ICP1_031119A** Analysis Date: **11/19/2003** Notes:

Analyte	Result	PQL	DF	Spike Value	Spike Ref Val	%REC	%REC Limits	RPD Ref Val	RPD	RPD Limit	Qual	Note
Arsenic	97.58	5.0	1	100	10.02	87.6	80 120	93	4.81	20		
Cadmium	76.18	2.0	1	100	2.587	73.6	80 120	78.21	2.62	20	S	Q02
Chromium	214.3	5.0	1	100	153.9	60.4	80 120	220.6	2.88	20	S	Q02

Sample ID: **0311084-01AMS** Batch ID: **8383** Test Code: **SW6010B** Prep Date: **11/18/2003** Units: **mg/Kg**
Client ID: Run ID: **ICP1_031119A** Analysis Date: **11/19/2003** Notes:

Analyte	Result	PQL	DF	Spike Value	Spike Ref Val	%REC	%REC Limits	RPD Ref Val	RPD	RPD Limit	Qual	Note
Lead	382.6	100	5	100	534.6	-152	80 120	0			S	Q14

Qualifiers:
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DF - Dilution Factor
RPD - Relative Percent Difference

Oceanic Analytical Laboratory, Inc.

Date: *Nov 25, 2003*

lient: Edward K. Noda & Associates
Lab Order: 0311087
Project: Upgrade Electrical System, Phase 1, Hickam AF

QC SUMMARY REPORT

Sample Matrix Spike Duplicate

Sample ID: **0311084-01AMSD** Batch ID: **8383** Test Code: **SW6010B** Prep Date: **11/18/2003** Units: **mg/Kg**
ent ID: Run ID: **ICP1_031119A** Analysis Date: **11/19/2003** Notes:

Analyte	Result	PQL	DF	Spike Value	Spike Ref Val	%REC	%REC Limits	RPD Ref Val	RPD	RPD Limit	Qual	Note
ad	1181	100	5	100	534.6	647	80 120	382.6	102	20	SR	Q14

Sample ID: **0311088-01AMS** Batch ID: **8367** Test Code: **SW8270C** Prep Date: **11/17/2003** Units: **mg/Kg**
ient ID: Run ID: **MSD3_031123A** Analysis Date: **11/24/2003** Notes:

Analyte	Result	PQL	DF	Spike Value	Spike Ref Val	%REC	%REC Limits	RPD Ref Val	RPD	RPD Limit	Qual	Note
enaphthene	0.133	0.0067	1	0.167	0.00367	77.4	31 137	0				
nzo(a)pyrene	0.157	0.0067	1	0.167	0.003	92.2	31 137	0				
Fluoranthene	0.1257	0.0067	1	0.167	0	75.2	31 137	0				
phthalene	0.097	0.0067	1	0.167	0	58.1	31 137	0				
Surr: 2-Fluorobiphenyl	0.75	0	1	1.67	0	44.9	30 115	0				
Surr: 4-Terphenyl-d14	0.682	0	1	1.67	0	40.8	18 137	0				A02
Surr: Nitrobenzene-d5	0.6403	0	1	1.67	0	38.3	23 120	0				

Sample ID: **0311088-01AMSD** Batch ID: **8367** Test Code: **SW8270C** Prep Date: **11/17/2003** Units: **mg/Kg**
Client ID: Run ID: **MSD3_031124B** Analysis Date: **11/24/2003** Notes:

Analyte	Result	PQL	DF	Spike Value	Spike Ref Val	%REC	%REC Limits	RPD Ref Val	RPD	RPD Limit	Qual	Note
Acenaphthene	0.1167	0.0067	1	0.167	0.00367	67.7	31 137	0.133	13.1	50		
nzo(a)pyrene	0.1617	0.0067	1	0.167	0.003	95	31 137	0.157	2.93	50		
Fluoranthene	0.1143	0.0067	1	0.167	0	68.5	31 137	0.1257	9.44	50		
Naphthalene	0.04933	0.0067	1	0.167	0	29.5	31 137	0.097	65.1	50	SR	Q14
Surr: 2-Fluorobiphenyl	0.6147	0	1	1.67	0	36.8	30 115	0	0	0		
Surr: 4-Terphenyl-d14	0.6373	0	1	1.67	0	38.2	18 137	0	0	0		
Surr: Nitrobenzene-d5	0.283	0	1	1.67	0	16.9	23 120	0	0	0	S	S04

mple ID: **0311088-01AMS** Batch ID: **8368** Test Code: **SW8015M** Prep Date: **11/17/2003** Units: **mg/Kg**
Client ID: Run ID: **GC2B_031118A** Analysis Date: **11/19/2003** Notes:

Analyte	Result	PQL	DF	Spike Value	Spike Ref Val	%REC	%REC Limits	RPD Ref Val	RPD	RPD Limit	Qual	Note
TPH (Diesel)	24.84	5.0	1	33.3	0	74.6	57 108	0				
Surr: Pentacosane	1.282	0	1	1.67	0	76.8	31 152	0				

Qualifiers:
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R - RPD outside established recovery limits
DF - Dilution Factor
RPD - Relative Percent Difference

Oceanic Analytical Laboratory, Inc. **Date:** *Nov 25, 2003*

Client: Edward K. Noda & Associates
Lab Order: 0311087
Project: Upgrade Electrical System, Phase 1, Hickam AF

QC SUMMARY REPORT

Sample Matrix Spike Duplicate

Sample ID: **0311088-01AMSD** Batch ID: **8368** Test Code: **SW8015M** Prep Date: **11/17/2003** Units: **mg/Kg**
Client ID: Run ID: **GC2B_031118A** Analysis Date: **11/19/2003** Notes:

Analyte	Result	PQL	DF	Spike Value	Spike Ref Val	%REC	%REC Limits		RPD Ref Val	RPD	RPD Limit	Qual	Note
TPH (Diesel)	25.08	5.0	1	33.3	0	75.3	57	108	24.84	0.94	50		
Surr: Pentacosane	1.253	0	1	1.67	0	75	31	152	0	0	0		

Qualifiers:
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B - Analyte detected in the associated Method Blank
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S - Spike Recovery outside established recovery limits
R - RPD outside established recovery limits
DF - Dilution Factor
RPD - Relative Percent Difference

Oceanic Analytical Laboratory, Inc.

Date: *Nov 25, 2003*

ient: Edward K. Noda & Associates
Lab Order: 0311087
oject: Upgrade Electrical System, Phase 1, Hickam AF

QC SUMMARY REPORT

Laboratory Control Spike - generic

Sample ID: **LCS-8419** Batch ID: **8419** Test Code: **SW1311/7470** Prep Date: **11/21/2003** Units: **mg/L**
ent ID: Run ID: **MERC_031121A** Analysis Date: **11/21/2003** Notes:

Analyte	Result	PQL	DF	Spike Value	Spike Ref Val	%REC	%REC Limits	RPD Ref Val	RPD	RPD Limit	Qual	Note
ercury	0.01035	0.0025	1	0.01	0	104	80 120	0				

Sample ID: **LCS-8417** Batch ID: **8417** Test Code: **SW1311/6010B** Prep Date: **11/21/2003** Units: **mg/L**
ent ID: Run ID: **ICP1_031121D** Analysis Date: **11/21/2003** Notes:

Analyte	Result	PQL	DF	Spike Value	Spike Ref Val	%REC	%REC Limits	RPD Ref Val	RPD	RPD Limit	Qual	Note
senic	1.094	0.50	1	1	0	109	80 120	0				
arium	1.125	1.0	1	1	0.06592	106	80 120	0				
Cadmium	1.062	0.050	1	1	0	106	80 120	0				
romium	1.044	0.10	1	1	0	104	80 120	0				
ad	1.057	0.20	1	1	0.01696	104	80 120	0				
Selenium	1.086	0.50	1	1	0	109	80 120	0				
ver	1.066	0.20	1	1	0	107	80 120	0				

Sample ID: **LCS-8378** Batch ID: **8378** Test Code: **SW8082** Prep Date: **11/18/2003** Units: **mg/Kg**
Client ID: Run ID: **GC1A_031119A** Analysis Date: **11/19/2003** Notes:

Analyte	Result	PQL	DF	Spike Value	Spike Ref Val	%REC	%REC Limits	RPD Ref Val	RPD	RPD Limit	Qual	Note
oclor 1016	0.1721	0.033	1	0.167	0	103	65 128	0				
oclor 1260	0.1749	0.033	1	0.167	0	105	63 130	0				
Surr: Decachlorobiphenyl	0.04292	0	1	0.03333	0	129	24 154	0				A01

Qualifiers:

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
%REC - % Recovery
S - Spike Recovery outside established recovery limits
R - RPD outside established recovery limits
DF - Dilution Factor
RPD - Relative Percent Difference

Oceanic Analytical Laboratory, Inc.

Date: *Nov 25, 2003*

Client: Edward K. Noda & Associates
Lab Order: 0311087
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QC SUMMARY REPORT

Laboratory Control Spike - generic

Sample ID: **LCSs111403** Batch ID: **R22260** Test Code: **SW8260B** Prep Date: **11/14/2003** Units: **mg/Kg**
Client ID: Run ID: **MSD1_031114B** Analysis Date: **11/14/2003** Notes:

Analyte	Result	PQL	DF	Spike Value	Spike Ref Val	%REC	%REC Limits		RPD Ref Val	RPD	RPD Limit	Qual	Note
1,1-Dichloroethene	0.09594	0.010	1	0.1	0	95.9	56	145	0				
Benzene	0.0927	0.010	1	0.1	0	92.7	66	124	0				
Chlorobenzene	0.08964	0.010	1	0.1	0	89.6	73	119	0				
Methyl tert-butyl ether	0.2052	0.0050	1	0.2	0	103	58	131	0				
Toluene	0.08354	0.010	1	0.1	0	83.5	74	116	0				
Trichloroethene	0.09274	0.010	1	0.1	0	92.7	78	127	0				
Surr: 1,2-Dichloroethane-d4	0.1173	0	1	0.1	0	117	58	180	0				
Surr: 4-Bromofluorobenzene	0.08986	0	1	0.1	0	89.9	69	173	0				
Surr: Dibromofluoromethane	0.1059	0	1	0.1	0	106	71	142	0				
Surr: Toluene-d8	0.09556	0	1	0.1	0	95.6	87	126	0				

Sample ID: **LCSDs111403** Batch ID: **R22260** Test Code: **SW8260B** Prep Date: **11/14/2003** Units: **mg/Kg**
Client ID: Run ID: **MSD1_031114B** Analysis Date: **11/14/2003** Notes:

Analyte	Result	PQL	DF	Spike Value	Spike Ref Val	%REC	%REC Limits		RPD Ref Val	RPD	RPD Limit	Qual	Note
1,1-Dichloroethene	0.08752	0.010	1	0.1	0	87.5	56	145	0.09594	9.18	25		
Benzene	0.0835	0.010	1	0.1	0	83.5	66	124	0.0927	10.4	25		
Chlorobenzene	0.08286	0.010	1	0.1	0	82.9	73	119	0.08964	7.86	25		
Methyl tert-butyl ether	0.1904	0.0050	1	0.2	0	95.2	58	131	0.2052	7.47	25		
Toluene	0.08154	0.010	1	0.1	0	81.5	74	116	0.08354	2.42	25		
Trichloroethene	0.08706	0.010	1	0.1	0	87.1	78	127	0.09274	6.32	25		
Surr: 1,2-Dichloroethane-d4	0.1085	0	1	0.1	0	109	58	180	0	0	0		
Surr: 4-Bromofluorobenzene	0.09394	0	1	0.1	0	93.9	69	173	0	0	0		
Surr: Dibromofluoromethane	0.09904	0	1	0.1	0	99	71	142	0	0	0		
Surr: Toluene-d8	0.1016	0	1	0.1	0	102	87	126	0	0	0		

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- %REC - % Recovery
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- R - RPD outside established recovery limits
- DF - Dilution Factor
- RPD - Relative Percent Difference

Oceanic Analytical Laboratory, Inc.

Date: *Nov 25, 2003*

Client: Edward K. Noda & Associates
Lab Order: 0311087
Project: Upgrade Electrical System, Phase 1, Hickam AF

QC SUMMARY REPORT
Laboratory Control Spike - generic

Sample ID: **LCSs112003** Batch ID: **R22373** Test Code: **SW8260B** Prep Date: **11/20/2003** Units: **mg/Kg**
Client ID: Run ID: **MSD1_031120A** Analysis Date: **11/20/2003** Notes:

Analyte	Result	PQL	DF	Spike Value	Spike Ref Val	%REC	%REC Limits (Low)	%REC Limits (High)	RPD Ref Val	RPD	RPD Limit	Qual	Note
1,1-Dichloroethene	0.0927	0.010	1	0.1	0	92.7	56	145	0				
Benzene	0.09422	0.010	1	0.1	0	94.2	66	124	0				
Chlorobenzene	0.0958	0.010	1	0.1	0	95.8	73	119	0				
Methyl tert-butyl ether	0.2082	0.0050	1	0.2	0	104	58	131	0				
Toluene	0.09112	0.010	1	0.1	0	91.1	74	116	0				
Trichloroethene	0.09562	0.010	1	0.1	0	95.6	78	127	0				
Surr: 1,2-Dichloroethane-d4	0.0988	0	1	0.1	0	98.8	58	180	0				
Surr: 4-Bromofluorobenzene	0.09714	0	1	0.1	0	97.1	69	173	0				
Surr: Dibromofluoromethane	0.09422	0	1	0.1	0	94.2	71	142	0				
Surr: Toluene-d8	0.09872	0	1	0.1	0	98.7	87	126	0				

Sample ID: **LCSDs112003** Batch ID: **R22373** Test Code: **SW8260B** Prep Date: **11/20/2003** Units: **mg/Kg**
Client ID: Run ID: **MSD1_031120A** Analysis Date: **11/20/2003** Notes:

Analyte	Result	PQL	DF	Spike Value	Spike Ref Val	%REC	%REC Limits (Low)	%REC Limits (High)	RPD Ref Val	RPD	RPD Limit	Qual	Note
1,1-Dichloroethene	0.07942	0.010	1	0.1	0	79.4	56	145	0.0927	15.4	25		
Benzene	0.0893	0.010	1	0.1	0	89.3	66	124	0.09422	5.36	25		
Chlorobenzene	0.09254	0.010	1	0.1	0	92.5	73	119	0.0958	3.46	25		
Methyl tert-butyl ether	0.1756	0.0050	1	0.2	0	87.8	58	131	0.2082	17	25		
Toluene	0.08834	0.010	1	0.1	0	88.3	74	116	0.09112	3.1	25		
Trichloroethene	0.08792	0.010	1	0.1	0	87.9	78	127	0.09562	8.39	25		
Surr: 1,2-Dichloroethane-d4	0.08916	0	1	0.1	0	89.2	58	180	0	0	0		
Surr: 4-Bromofluorobenzene	0.09216	0	1	0.1	0	92.2	69	173	0	0	0		
Surr: Dibromofluoromethane	0.09196	0	1	0.1	0	92	71	142	0	0	0		
Surr: Toluene-d8	0.09942	0	1	0.1	0	99.4	87	126	0	0	0		

Qualifiers:
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%REC - % Recovery
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Oceanic Analytical Laboratory, Inc.

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QC SUMMARY REPORT

Laboratory Control Spike - generic

Sample ID: **LCS112003GBTEX** Batch ID: **R22356** Test Code: **SW5030/8015M/8021B** Prep Date: **11/20/2003** Units: **mg/Kg**
Client ID: Run ID: **GC7A_031120A** Analysis Date: **11/20/2003** Notes:

Analyte	Result	PQL	DF	Spike Value	Spike Ref Val	%REC	%REC Limits	RPD Ref Val	RPD	RPD Limit	Qual	Note
TPH (Gasoline C6-C12)	10.5	1.0	1	11	0	95.5	68 111	0				
Benzene	0.1507	0.010	1	0.162	0	93	88 117	0				
Ethylbenzene	0.1821	0.010	1	0.174	0	105	91 113	0				
m,p-Xylene	0.6457	0.020	1	0.648	0.00147	99.4	89 116	0				
o-Xylene	0.2165	0.010	1	0.252	0	85.9	93 115	0			S	Q01
Toluene	0.7059	0.010	1	0.778	0.00089	90.6	90 115	0				
Surr: a,a,a-Trifluorotoluene	0.3235	0	1	0.3	0	108	54 126	0				

Sample ID: **LCSD112003GBT** Batch ID: **R22356** Test Code: **SW5030/8015M/8021B** Prep Date: **11/20/2003** Units: **mg/Kg**
Client ID: Run ID: **GC7A_031120A** Analysis Date: **11/20/2003** Notes:

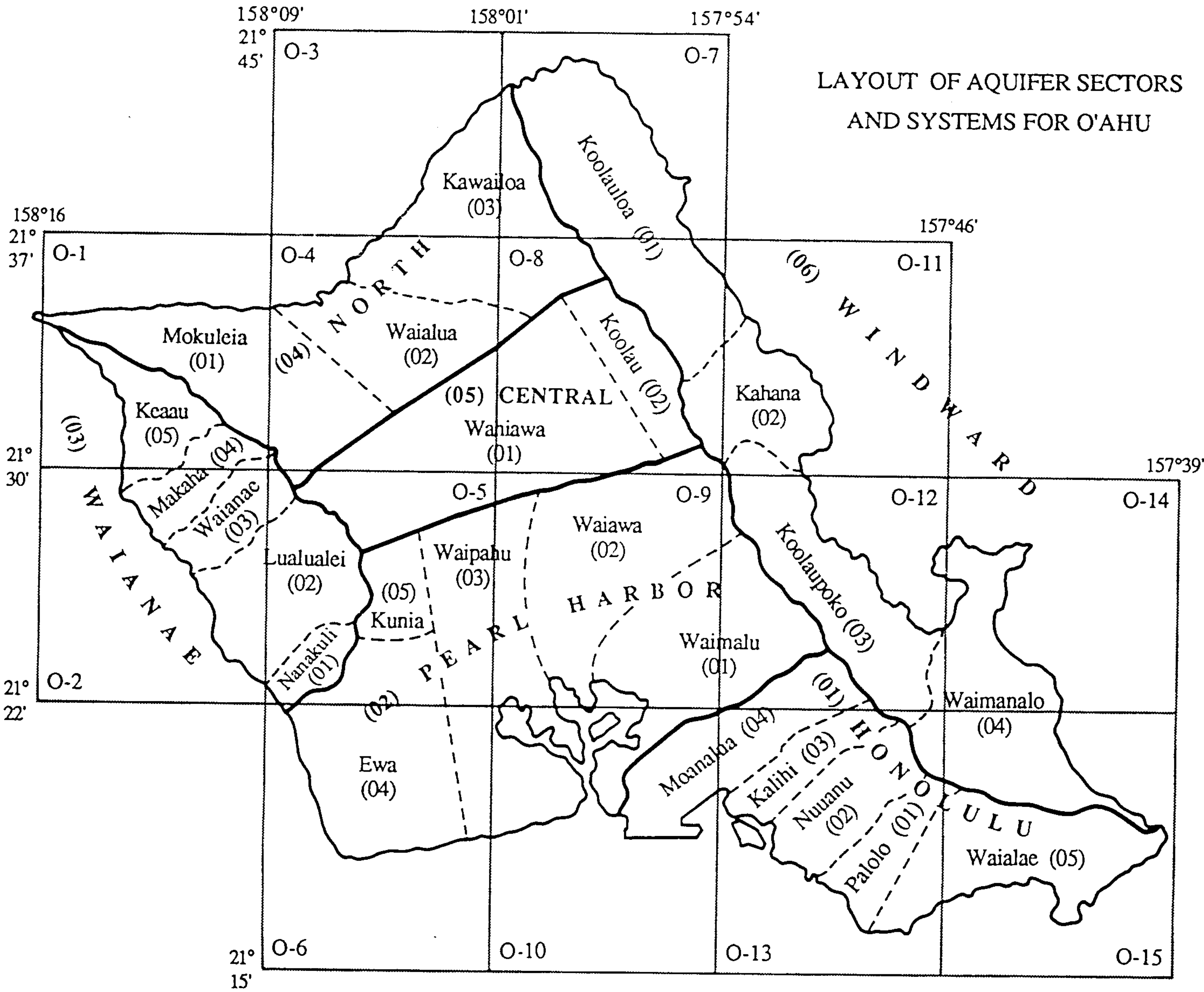
Analyte	Result	PQL	DF	Spike Value	Spike Ref Val	%REC	%REC Limits	RPD Ref Val	RPD	RPD Limit	Qual	Note
TPH (Gasoline C6-C12)	10.8	1.0	1	11	0	98.2	68 111	10.5	2.82	25		
Benzene	0.1616	0.010	1	0.162	0	99.8	88 117	0.1507	6.98	25		
Ethylbenzene	0.1995	0.010	1	0.174	0	115	91 113	0.1821	9.12	25	S	Q01
m,p-Xylene	0.7118	0.020	1	0.648	0.00147	110	89 116	0.6457	9.74	25		
o-Xylene	0.2488	0.010	1	0.252	0	98.7	93 115	0.2165	13.9	25		
Toluene	0.7705	0.010	1	0.778	0.00089	98.9	90 115	0.7059	8.75	25		
Surr: a,a,a-Trifluorotoluene	0.332	0	1	0.3	0	111	54 126	0	0	0		

Sample ID: **LCS-8383** Batch ID: **8383** Test Code: **SW6010B** Prep Date: **11/18/2003** Units: **mg/Kg**
Client ID: Run ID: **ICP1_031119A** Analysis Date: **11/19/2003** Notes:

Analyte	Result	PQL	DF	Spike Value	Spike Ref Val	%REC	%REC Limits	RPD Ref Val	RPD	RPD Limit	Qual	Note
Arsenic	98.02	5.0	1	100	0	98	80 120	0				
Cadmium	96.03	2.0	1	100	0	96	80 120	0				
Chromium	94.89	5.0	1	100	0	94.9	80 120	0				
Lead	95.2	20	1	100	0	95.2	80 120	0				

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
%REC - % Recovery
S - Spike Recovery outside established recovery limits
R - RPD outside established recovery limits
DF - Dilution Factor
RPD - Relative Percent Difference

LAYOUT OF AQUIFER SECTORS
AND SYSTEMS FOR O'AHU



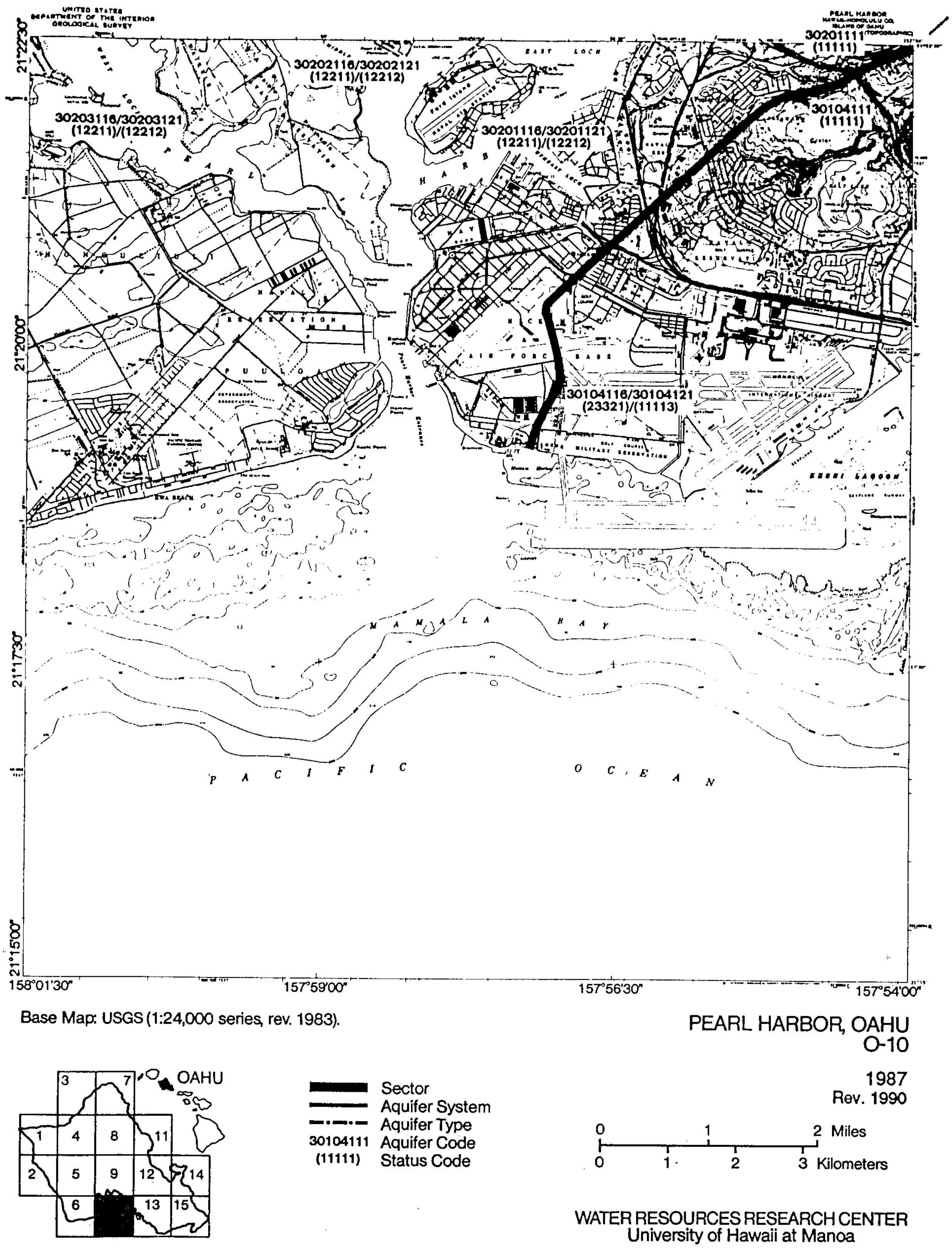


Figure 1.10. Aquifer classification map, Pearl Harbor, O'ahu, Hawai'i

AQUIFER CLASSIFICATION EXPLANATION

AQUIFER AND STATUS CODES*

Aquifer Code	=	Island
	+	Aquifer Sector
	+	Aquifer System
	+	Aquifer Type
Thus, 30104111	=	Aquifer Code
where 3	=	Oahu
01	=	Honolulu
04	=	Moanalua
1	=	basal
1	=	unconfined
1	=	flank
and		
(11111)	=	Status Code
where 1	=	currently used
1	=	drinking
1	=	fresh, <250 mg/l Cl^-
1	=	irreplaceable
1	=	high vulnerability to contamination

IS.	AQUIFER SECTOR		AQUIFER SYSTEM	
3	01	Honolulu	01	Palolo
			02	Nuuanu
			03	Kalihi
			04	Moanalua
			05	Waialae
	02	Pearl Harbor	01	Waimalu
			02	Waiawa
			03	Waipahu
			04	Ewa
			05	Kunia
	03	Waianae	01	Nanakuli
			02	Lualualei
			03	Waianae
			04	Makaha
			05	Keaau
	04	North	01	Mokuleia
			02	Waialua
			03	Kawailoa
	05	Central	01	Wahiawa
			02	Koolau
	06	Windward	01	Koolauloa
			02	Kahana
			03	Koolaupoko
			04	Waimanalo

*Where sedimentary caprock aquifers rest on primary basalt aquifers, two Aquifer and Status Codes separated by a slash indicate numerator code is upper aquifer and denominator is lower aquifer.

AQUIFER TYPE:		Hydrology†
1	Basal	Fresh water in contact with seawater
2	High Level	Fresh water not in contact with seawater
1	Unconfined	Where water table is upper surface of saturated aquifer
2	Confined	Aquifer bounded by impermeable or poorly permeable formations, and top of saturated aquifer is below groundwater surface
3	Confined or Unconfined	Where actual condition is uncertain

AQUIFER TYPE:		Geology‡
1	Flank	Horizontally extensive lavas
2	Dike	Aquifers in dike compartments
3	Flank/Dike	Indistinguishable
4	Perched	Aquifer on an impermeable layer
5	Dike/Perched	Indistinguishable
6	Sedimentary	Nonvolcanic lithology

†1st two digits from hydrologic descriptors (pts. 1, 2).
‡Last digit from geologic descriptor.

STATUS CODE (GROUNDWATER)

Development Stage
1 Currently used
2 Potential use
3 No potential use

Utility
1 Drinking
2 Ecologically important
3 Neither

Salinity (mg/l Cl^-)
1 Fresh (<250)
2 Low (250-1000)
3 Moderate (1000-5000)
4 High (5000-15,000)
5 Seawater (>15,000)

Uniqueness
1 Irreplaceable
2 Replaceable

Vulnerability to Contamination
1 High
2 Moderate
3 Low
4 None

Rev. Feb. 1990

Oceanic Analytical Laboratory, Inc.

Date: *Nov 25, 2003*

Client: Edward K. Noda & Associates
Lab Order: 0311087
Project: Upgrade Electrical System, Phase 1, Hickam AF

QC SUMMARY REPORT

Laboratory Control Spike - generic

Sample ID: **LCS-8367** Batch ID: **8367** Test Code: **SW8270C** Prep Date: **11/17/2003** Units: **mg/Kg**
Client ID: Run ID: **MSD3_031123A** Analysis Date: **11/23/2003** Notes:

Analyte	Result	PQL	DF	Spike Value	Spike Ref Val	%REC	%REC Limits	RPD Ref Val	RPD	RPD Limit	Qual	Note
Acenaphthene	0.1077	0.0067	1	0.167	0.00367	62.3	38 107	0				
Benzo(a)pyrene	0.1403	0.0067	1	0.167	0.003	82.2	45 100	0				
Fluoranthene	0.139	0.0067	1	0.167	0	83.2	45 107	0				
Naphthalene	0.09433	0.0067	1	0.167	0	56.5	31 104	0				
Surr: 2-Fluorobiphenyl	0.7003	0	1	1.67	0	41.9	30 115	0				
Surr: 4-Terphenyl-d14	0.805	0	1	1.67	0	48.2	18 137	0				
Surr: Nitrobenzene-d5	0.6677	0	1	1.67	0	40	23 120	0				

Sample ID: **LCS-8368** Batch ID: **8368** Test Code: **SW8015M** Prep Date: **11/17/2003** Units: **mg/Kg**
Client ID: Run ID: **GC2B_031118A** Analysis Date: **11/18/2003** Notes:

Analyte	Result	PQL	DF	Spike Value	Spike Ref Val	%REC	%REC Limits	RPD Ref Val	RPD	RPD Limit	Qual	Note
TPH (Diesel)	24.02	5.0	1	33.3	0	72.1	57 108	0				
Surr: Pentacosane	1.249	0	1	1.67	0	74.8	31 152	0				

Qualifiers:

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
%REC - % Recovery
S - Spike Recovery outside established recovery limits
R - RPD outside established recovery limits
DF - Dilution Factor
RPD - Relative Percent Difference

SAMPLE CHAIN OF CUSTODY RECORD

Edward K. Noda and Associates, Inc.
615 Piikoi Street, Suite 300, Honolulu, Hawaii 96814
Telephone: (808) 591-8553 Facsimile: (808) 593-8551

Project Manager / Contact: D. Fraim

Samples Collected by: D. Fraim

EKNA Job Name: Upgrade Electrical System, Phase 1, Hickam AFB

EKNA Job Number: 2396-01F

Sample Turnaround Time	Total Number of Samples in Shipment
Standard - 10 Working Days	

UST ☐
NPDES ☐
NOI ☐
DRINKING
PCB ☐
OTHER ☐
QC LEVEL ☐ A ☐ B ☐ C ☐ D

Laboratory I.D. Number: 0311087

Laboratory Analyses Requested: (1) TPH - Fuel Fingerprint (8015M); (2) TPH - Gas (8015M); (3) TPH - Diesel (8015M); (4) TPH - Jet Fuel (8015M); (5) BTEX (8021B); (6) VOCs (8260B); (7) PAH (8270C); (8) Total Metals - As, Cd, Cr, Pb (6010); (9) TCLP RCRA 8 Metals (1311/6010); (10) Total PCB (8082)

Sample Number	Grab or Comp	Date Collected	Time Collected	Sample Matrix	No. of Containers	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	Laboratory Sample #	Container Type	PID Reading (ppm)
N1-2.0	Grab	11/12/03	0835	Soil	1	X	X	X	X	X	X	X	X	X	X	-01	Tube	0.1
N1-5.0			0844			X	X	X	X	X	X	X	X	X	X	-02		0.1
N2-2.0			0920			X	X	X	X	X	X	X	X	X	X	-03		0.1
N2-5.0			0924			X	X	X	X	X	X	X	X	X	X	-04		0.1
N10-1.0			1004			X	X	X	X	X	X	X	X	X	X	-05		0.1
N10-3.0			1017			X	X	X	X	X	X	X	X	X	X	-06		0.1

Relinquished by (Name & Signature)	Company	Date	Time	Received by (Name & Signature)	Company	Date	Time
1. D. Fraim [signature]	EKNA	11/12/03	1100	2. [signature]	OAL	11/12/03	1100
3.				4. Rental 3-10°C	Wet		
5.				6.			

Comments:

Dispose Samples	XX
Return Samples	

December 02, 2003

Dayton E. Fraim
Edward K. Noda & Associates
615 Piikoi Street, Suite 300
Honolulu, HI 96814
TEL: (808) 591-8553
FAX: (808) 593-8551

RE: Upgrade Electrical System, Phase 1, Hickam AFB Order No.: 0311088

Dear Dayton E. Fraim:

Oceanic Analytical Laboratory, Inc. received 14 samples on 11/12/2003 2:25:00 PM for the analyses presented in the following report.

All data presented in the following report are relevant only to the samples as received and to the items tested by the laboratory. The report shall not be reproduced except in full, without the written approval of the laboratory.

There were no problems with the analyses and all data for associated QC met laboratory specifications except where noted in the Case Narrative.

Applicable samples will be stored at no extra charge for a period of 30 days following the final report. Samples will be properly disposed of after 30 days, unless notified otherwise in writing.

If you have any questions regarding these tests results, please feel free to call.

Very truly yours,
OCEANIC ANALYTICAL LABORATORY, INC.

Kenneth K.F. Lee
Laboratory Director

Oceanic Analytical Laboratory, Inc.

Date: *Dec 02, 2003*

Client: Edward K. Noda & Associates
Project: Upgrade Electrical System, Phase 1, Hickam AF
Lab Order: 0311088
Date Received: 11/12/2003

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Collection Date	Sample On Hold
0311088-01A	N9-3.0	11/11/2003 8:50:00 AM	☐
0311088-01B	N9-3.0	11/11/2003 8:50:00 AM	☐
0311088-02A	N9-10.0	11/11/2003 9:10:00 AM	☐
0311088-02B	N9-10.0	11/11/2003 9:10:00 AM	☐
0311088-03A	N8-3.0	11/11/2003 10:08:00 AM	☐
0311088-03B	N8-3.0	11/11/2003 10:08:00 AM	☐
0311088-04A	N8-10.0	11/11/2003 10:20:00 AM	☐
0311088-04B	N8-10.0	11/11/2003 10:20:00 AM	☐
0311088-05A	N7-2.0	11/11/2003 11:10:00 AM	☐
0311088-05B	N7-2.0	11/11/2003 11:10:00 AM	☐
0311088-06A	N7-10.0	11/11/2003 11:25:00 AM	☐
0311088-06B	N7-10.0	11/11/2003 11:25:00 AM	☐
0311088-07A	N6-3.0	11/11/2003 12:57:00 PM	☐
0311088-07B	N6-3.0	11/11/2003 12:57:00 PM	☐
0311088-08A	N6-10.0	11/11/2003 1:06:00 PM	☐
0311088-08B	N6-10.0	11/11/2003 1:06:00 PM	☐
0311088-09A	N5-3.0	11/11/2003 2:04:00 PM	☐
0311088-09B	N5-3.0	11/11/2003 2:04:00 PM	☐
0311088-10A	N5-6.0	11/11/2003 2:12:00 PM	☐
0311088-10B	N5-6.0	11/11/2003 2:12:00 PM	☐
0311088-11A	N4-3.0	11/11/2003 3:03:00 PM	☐
0311088-11B	N4-3.0	11/11/2003 3:03:00 PM	☐
0311088-12A	N4-8.0	11/11/2003 3:10:00 PM	☐
0311088-12B	N4-8.0	11/11/2003 3:10:00 PM	☐
0311088-13A	N3-3.0	11/11/2003 3:45:00 PM	☐
0311088-13B	N3-3.0	11/11/2003 3:45:00 PM	☐
0311088-14A	N3-5.0	11/11/2003 3:52:00 PM	☐
0311088-14B	N3-5.0	11/11/2003 3:52:00 PM	☐

Oceanic Analytical Laboratory, Inc.

Date: *Dec 02, 2003*

Client:	Edward K. Noda & Associates
Project:	Upgrade Electrical System, Phase 1, Hickam AF
Lab Order:	0311088

CASE NARRATIVE

Samples were analyzed using the methods outlined in the following references:

Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW846, 3rd Edition.

All method blanks, laboratory spikes, and/or matrix spikes met quality assurance objectives.

A01: The closing contunuing calibration verification (CCV) for this surrogate failed high by 1.9% at 16.9%.

A02: The contunuing calibration verification (CCV) for this surrogate failed low by 10.6% at 69.4%.

G08: The fuel pattern in the gasoline range does not resemble a gasoline standard. The pattern resembles that of a heavier hydrocarbon or weathered gas.

Q01: The spike recovery for this QC sample is outside of established control limits. Review of associated batch QC indicates the recovery for this analyte does not represent an out-of-control condition for the batch.

Q02: The spike recovery for this QC sample is outside of established control limits due to sample matrix interference.

Q14: Visual examination indicates the RPD and/or matrix spike recovery is outside the control limit due to a nonhomogeneous sample matrix.

S02: The surrogate recovery for this sample cannot be accurately quantified due to interference from coeluting organic compounds present in the sample.

S04: The surrogate recovery for this sample is outside of established control limits due to a sample matrix effect.

Oceanic Analytical Laboratory, Inc.

Date: *Dec 02, 2003*

Client: Edward K. Noda & Associates
Lab Order: 0311088
Project: Upgrade Electrical System, Phase 1, Hickam AFB
Lab ID: 0311088-01A

Client Sample ID: N9-3.0
Tag Number:
Collection Date: 11/11/2003 8:50
Matrix: SOIL

Analyses	Result	Reporting Limit	Units	Dilution Factor	Date Prepared	Date Analyzed	Batch ID	Analyst	Qual	Notes
ICP METALS, TCLP LEACHED			**SW1311/6010B**							
Arsenic	ND	0.500	mg/L	1	11/21/2003	11/22/2003	8417	TKL		
Barium	ND	1.00	mg/L	1						
Cadmium	ND	0.0500	mg/L	1						
Chromium	ND	0.100	mg/L	1						
Lead	ND	0.200	mg/L	1						
Selenium	ND	0.500	mg/L	1						
Silver	ND	0.200	mg/L	1						
ICP METALS-RCRA, TOTAL			**SW6010B**							
Arsenic	ND	5.00	mg/Kg	1	11/21/2003	11/21/2003	8413	TKL		
Cadmium	ND	2.00	mg/Kg	1						
Chromium	*48.0*	5.00	mg/Kg	1						
Lead	ND	20.0	mg/Kg	1						
MERCURY, TCLP LEACHED			**SW1311/7470**							
Mercury	ND	0.00250	mg/L	1	11/25/2003	11/25/2003	8440	SYL		
PAH BY EPA 8270 SIM			**SW8270C**							
Acenaphthene	ND	0.00667	mg/Kg	1	11/17/2003	11/24/2003	8367	SLK		
Benzo(a)pyrene	ND	0.00667	mg/Kg	1						
Fluoranthene	ND	0.00667	mg/Kg	1						
Naphthalene	ND	0.00667	mg/Kg	1						
Surr: 2-Fluorobiphenyl	50.8	30-115	%REC	1						
Surr: 4-Terphenyl-d14	37.6	18-137	%REC	1						A02
Surr: Nitrobenzene-d5	48.4	23-120	%REC	1						
PCBS IN SOIL OR SOLID WASTE			**SW8082**							
Aroclor 1016	ND	0.0333	mg/Kg	1	11/18/2003	11/19/2003	8378	SLK		
Aroclor 1221	ND	0.0667	mg/Kg	1						
Aroclor 1232	ND	0.0333	mg/Kg	1						
Aroclor 1242	ND	0.0333	mg/Kg	1						
Aroclor 1248	ND	0.0333	mg/Kg	1						
Aroclor 1254	ND	0.0333	mg/Kg	1						
Aroclor 1260	ND	0.0333	mg/Kg	1						
Surr: Decachlorobiphenyl	105	24-154	%REC	1						

Qualifiers:

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
* - Value exceeds Maximum Contaminant Level
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range

Oceanic Analytical Laboratory, Inc.

Date: *Dec 02, 2003*

C ent:	Edward K. Noda & Associates	**Client Sample ID:**	N9-3.0
Lab Order:	0311088	**Tag Number:**	
P oject:	Upgrade Electrical System, Phase 1, Hickam AFB	**Collection Date:**	11/11/2003 8:50
L o ID:	0311088-01A	**Matrix:**	SOIL

A alyses	Result	Reporting Limit	Units	Dilution Factor	Date Prepared	Date Analyzed	Batch ID	Analyst	Qual	Notes
T. H (FUEL FINGERPRINT)			**SW8015M**							
TPH (Diesel)	ND	5.00	mg/Kg	1	11/17/2003	11/18/2003	8368	MDH		
'H (Jet A)	ND	5.00	mg/Kg	1						
'H (JP-4)	ND	5.00	mg/Kg	1						
TPH (JP-5)	ND	5.00	mg/Kg	1						
TPH (Kerosene)	ND	5.00	mg/Kg	1						
'H (Motor Oil)	ND	20.0	mg/Kg	1						
..'H (Paint Thinner)	ND	5.00	mg/Kg	1						
TPH (Unidentifed Hydrocarbons as ¯'esel)	ND	5.00	mg/Kg	1						
'H (Unidentifed Hydrocarbons as ıvıotor Oil)	ND	20.0	mg/Kg	1						
Surr: Pentacosane	70.5	31-152	%REC	1						

Qualifiers:

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J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

* - Value exceeds Maximum Contaminant Level

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

Oceanic Analytical Laboratory, Inc.

Date: *Dec 02, 2003*

Client:	Edward K. Noda & Associates	**Client Sample ID:**	N9-3.0
Lab Order:	0311088	**Tag Number:**	
Project:	Upgrade Electrical System, Phase 1, Hickam AFB	**Collection Date:**	11/11/2003 8:50
Lab ID:	0311088-01B	**Matrix:**	SOIL

Analyses	Result	Reporting Limit	Units	Dilution Factor	Date Prepared	Date Analyzed	Batch ID	Analyst	Qual	Notes
TPH GASOLINE W/BTEX			**SW5030/8015M/8021B**							
Benzene	ND	0.00200	mg/Kg	1	11/20/2003	11/20/2003	R22368	SJR		
Ethylbenzene	ND	0.00200	mg/Kg	1						
m,p-Xylene	ND	0.00400	mg/Kg	1						
o-Xylene	ND	0.00200	mg/Kg	1						
Toluene	ND	0.00200	mg/Kg	1						
TPH (Gasoline C6-C12)	ND	0.200	mg/Kg	1						
Surr: a,a,a-Trifluorotoluene	93.0	54-126	%REC	1						

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

* - Value exceeds Maximum Contaminant Level

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

Oceanic Analytical Laboratory, Inc.

Date: *Dec 02, 2003*

(ent:	Edward K. Noda & Associates	**Client Sample ID:**	N9-3.0
Lab Order:	0311088	**Tag Number:**	
F)ject:	Upgrade Electrical System, Phase 1, Hickam AFB	**Collection Date:**	11/11/2003 8:50
I b ID:	0311088-01B	**Matrix:**	SOIL

A ılyses	Result	Reporting Limit	Units	Dilution Factor	Date Prepared	Date Analyzed	Batch ID	Analyst	Qual	Notes
V LATILES BY GC/MS			**SW8260B**							
1,1,1,2-Tetrachloroethane	ND	0.0100	mg/Kg	1	11/20/2003	11/20/2003	R22373	KAL		
1,1-Trichloroethane	ND	0.0100	mg/Kg	1						
,2,2-Tetrachloroethane	ND	0.0100	mg/Kg	1						
1,1,2-Trichloroethane	ND	0.0100	mg/Kg	1						
1,1-Dichloroethane	ND	0.0500	mg/Kg	1						
-Dichloroethene	ND	0.0100	mg/Kg	1						
-Dichloropropene	ND	0.0100	mg/Kg	1						
1,2,3-Trichlorobenzene	ND	0.0100	mg/Kg	1						
,3-Trichloropropane	ND	0.0100	mg/Kg	1						
,4-Trichlorobenzene	ND	0.0500	mg/Kg	1						
1,2,4-Trimethylbenzene	ND	0.0100	mg/Kg	1						
1 2-Dibromo-3-chloropropane	ND	0.0100	mg/Kg	1						
-Dibromoethane	ND	0.0100	mg/Kg	1						
,2-Dichlorobenzene	ND	0.0500	mg/Kg	1						
1,2-Dichloroethane	ND	0.0100	mg/Kg	1						
-Dichloropropane	ND	0.0100	mg/Kg	1						
,5-Trimethylbenzene	ND	0.0100	mg/Kg	1						
1,3-Dichlorobenzene	ND	0.0500	mg/Kg	1						
3-Dichloropropane	ND	0.0100	mg/Kg	1						
-Dichlorobenzene	ND	0.0500	mg/Kg	1						
2,2-Dichloropropane	ND	0.0100	mg/Kg	1						
2-Butanone	ND	0.0500	mg/Kg	1						
Chlorotoluene	ND	0.0100	mg/Kg	1						
lexanone	ND	0.0500	mg/Kg	1						
4-Chlorotoluene	ND	0.0100	mg/Kg	1						
sopropyltoluene	ND	0.0100	mg/Kg	1						
Methyl-2-pentanone	ND	0.0500	mg/Kg	1						
Acetone	ND	0.0500	mg/Kg	1						
Acrylonitrile	ND	0.0500	mg/Kg	1						
nzene	ND	0.0100	mg/Kg	1						
omobenzene	ND	0.0100	mg/Kg	1						
Bromochloromethane	ND	0.0500	mg/Kg	1						
omodichloromethane	ND	0.0100	mg/Kg	1						
omoform	ND	0.0100	mg/Kg	1						
Bromomethane	ND	0.100	mg/Kg	1						
rbon disulfide	ND	0.0100	mg/Kg	1						
rbon tetrachloride	ND	0.0100	mg/Kg	1						
Chlorobenzene	ND	0.0100	mg/Kg	1						
Chloroethane	ND	0.0500	mg/Kg	1						
loroform	ND	0.0100	mg/Kg	1						

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

* - Value exceeds Maximum Contaminant Level

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

Oceanic Analytical Laboratory, Inc.

Date: *Dec 02, 2003*

Client:	Edward K. Noda & Associates	**Client Sample ID:**	N9-3.0
Lab Order:	0311088	**Tag Number:**	
Project:	Upgrade Electrical System, Phase 1, Hickam AFB	**Collection Date:**	11/11/2003 8:50
Lab ID:	0311088-01B	**Matrix:**	SOIL

Analyses	Result	Reporting Limit	Units	Dilution Factor	Date Prepared	Date Analyzed	Batch ID	Analyst	Qual	Notes
Chloromethane	ND	0.0500	mg/Kg	1						
cis-1,2-Dichloroethene	ND	0.0100	mg/Kg	1						
cis-1,3-Dichloropropene	ND	0.0100	mg/Kg	1						
Dibromochloromethane	ND	0.0100	mg/Kg	1						
Dibromomethane	ND	0.0100	mg/Kg	1						
Dichlorodifluoromethane	ND	0.0500	mg/Kg	1						
Ethylbenzene	ND	0.0100	mg/Kg	1						
Hexachlorobutadiene	ND	0.0500	mg/Kg	1						
Iodomethane	ND	0.0500	mg/Kg	1						
Isopropylbenzene	ND	0.0100	mg/Kg	1						
m,p-Xylene	ND	0.0100	mg/Kg	1						
Methyl tert-butyl ether	ND	0.00500	mg/Kg	1						
Methylene chloride	ND	0.0500	mg/Kg	1						
n-Butylbenzene	ND	0.0100	mg/Kg	1						
n-Propylbenzene	ND	0.0100	mg/Kg	1						
Naphthalene	ND	0.0500	mg/Kg	1						
o-Xylene	ND	0.0100	mg/Kg	1						
sec-Butylbenzene	ND	0.0100	mg/Kg	1						
Styrene	ND	0.0100	mg/Kg	1						
tert-Butylbenzene	ND	0.0100	mg/Kg	1						
Tetrachloroethene	ND	0.0100	mg/Kg	1						
Toluene	ND	0.0100	mg/Kg	1						
trans-1,2-Dichloroethene	ND	0.0100	mg/Kg	1						
trans-1,3-Dichloropropene	ND	0.0100	mg/Kg	1						
trans-1,4-Dichloro-2-butene	ND	0.0500	mg/Kg	1						
Trichloroethene	ND	0.0100	mg/Kg	1						
Trichlorofluoromethane	ND	0.0100	mg/Kg	1						
Vinyl acetate	ND	0.0500	mg/Kg	1						
Vinyl chloride	ND	0.0500	mg/Kg	1						
Surr: 1,2-Dichloroethane-d4	107	58-180	%REC	1						
Surr: 4-Bromofluorobenzene	124	69-173	%REC	1						
Surr: Dibromofluoromethane	95.5	71-142	%REC	1						
Surr: Toluene-d8	105	87-126	%REC	1						

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

* - Value exceeds Maximum Contaminant Level

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

Oceanic Analytical Laboratory, Inc.

Date: *Dec 02, 2003*

Client:	Edward K. Noda & Associates	**Client Sample ID:**	N9-10.0
Lab Order:	0311088	**Tag Number:**	
Project:	Upgrade Electrical System, Phase 1, Hickam AFB	**Collection Date:**	11/11/2003 9:10
Lab ID:	0311088-02A	**Matrix:**	SOIL

Analyses	Result	Reporting Limit	Units	Dilution Factor	Date Prepared	Date Analyzed	Batch ID	Analyst	Qual	Notes
ICP METALS, TCLP LEACHED			**SW1311/6010B**							
Arsenic	ND	0.500	mg/L	1	11/21/2003	11/22/2003	8417	TKL		
Barium	ND	1.00	mg/L	1						
Cadmium	ND	0.0500	mg/L	1						
Chromium	ND	0.100	mg/L	1						
Lead	ND	0.200	mg/L	1						
Selenium	ND	0.500	mg/L	1						
Silver	ND	0.200	mg/L	1						
ICP METALS-RCRA, TOTAL			**SW6010B**							
Arsenic	ND	5.00	mg/Kg	1	11/21/2003	11/21/2003	8413	TKL		
Cadmium	ND	2.00	mg/Kg	1						
Chromium	*77.1*	5.00	mg/Kg	1						
Lead	ND	20.0	mg/Kg	1						
MERCURY, TCLP LEACHED			**SW1311/7470**							
Mercury	ND	0.00250	mg/L	1	11/25/2003	11/25/2003	8440	SYL		
PAH BY EPA 8270 SIM			**SW8270C**							
Acenaphthene	ND	0.00667	mg/Kg	1	11/17/2003	11/26/2003	8367	SLK		
Benzo(a)pyrene	ND	0.00667	mg/Kg	1						
Fluoranthene	ND	0.00667	mg/Kg	1						
Naphthalene	ND	0.00667	mg/Kg	1						
Surr: 2-Fluorobiphenyl	51.4	30-115	%REC	1						
Surr: 4-Terphenyl-d14	58.9	18-137	%REC	1						
Surr: Nitrobenzene-d5	50.5	23-120	%REC	1						
PCBS IN SOIL OR SOLID WASTE			**SW8082**							
Aroclor 1016	ND	0.0333	mg/Kg	1	11/18/2003	11/19/2003	8378	SLK		
Aroclor 1221	ND	0.0667	mg/Kg	1						
Aroclor 1232	ND	0.0333	mg/Kg	1						
Aroclor 1242	ND	0.0333	mg/Kg	1						
Aroclor 1248	ND	0.0333	mg/Kg	1						
Aroclor 1254	ND	0.0333	mg/Kg	1						
Aroclor 1260	ND	0.0333	mg/Kg	1						
Surr: Decachlorobiphenyl	102	24-154	%REC	1						

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

* - Value exceeds Maximum Contaminant Level

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

Oceanic Analytical Laboratory, Inc.

Date: *Dec 02, 2003*

Client:	Edward K. Noda & Associates	**Client Sample ID:**	N9-10.0
Lab Order:	0311088	**Tag Number:**	
Project:	Upgrade Electrical System, Phase 1, Hickam AFB	**Collection Date:**	11/11/2003 9:10
Lab ID:	0311088-02A	**Matrix:**	SOIL

Analyses	Result	Reporting Limit	Units	Dilution Factor	Date Prepared	Date Analyzed	Batch ID	Analyst	Qual	Notes
TPH (FUEL FINGERPRINT)			**SW8015M**							
TPH (Diesel)	ND	5.00	mg/Kg	1	11/17/2003	11/18/2003	8368	MDH		
TPH (Jet A)	ND	5.00	mg/Kg	1						
TPH (JP-4)	ND	5.00	mg/Kg	1						
TPH (JP-5)	ND	5.00	mg/Kg	1						
TPH (Kerosene)	ND	5.00	mg/Kg	1						
TPH (Motor Oil)	ND	20.0	mg/Kg	1						
TPH (Paint Thinner)	ND	5.00	mg/Kg	1						
TPH (Unidentifed Hydrocarbons as Diesel)	ND	5.00	mg/Kg	1						
TPH (Unidentifed Hydrocarbons as Motor Oil)	ND	20.0	mg/Kg	1						
Surr: Pentacosane	72.7	31-152	%REC	1						

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

* - Value exceeds Maximum Contaminant Level

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

Oceanic Analytical Laboratory, Inc.

Date: *Dec 02, 2003*

C ent:	Edward K. Noda & Associates	**Client Sample ID:**	N9-10.0
Lab Order:	0311088	**Tag Number:**	
I oject:	Upgrade Electrical System, Phase 1, Hickam AFB	**Collection Date:**	11/11/2003 9:10
I b ID:	0311088-02B	**Matrix:**	SOIL

A alyses	Result	Reporting Limit	Units	Dilution Factor	Date Prepared	Date Analyzed	Batch ID	Analyst	Qual	Notes
T. H GASOLINE W/BTEX			SW5030/8015M/8021B							
Benzene	ND	0.00200	mg/Kg	1	11/20/2003	11/20/2003	R22368	SJR		
‾ hylbenzene	ND	0.00200	mg/Kg	1						
p-Xylene	ND	0.00400	mg/Kg	1						
o-Xylene	ND	0.00200	mg/Kg	1						
Toluene	ND	0.00200	mg/Kg	1						
'H (Gasoline C6-C12)	ND	0.200	mg/Kg	1						
Surr: a,a,a-Trifluorotoluene	82.5	54-126	%REC	1						

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

* - Value exceeds Maximum Contaminant Level

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

Oceanic Analytical Laboratory, Inc.

Date: *Dec 02, 2003*

Client:	Edward K. Noda & Associates	**Client Sample ID:**	N9-10.0
Lab Order:	0311088	**Tag Number:**	
Project:	Upgrade Electrical System, Phase 1, Hickam AFB	**Collection Date:**	11/11/2003 9:10
Lab ID:	0311088-02B	**Matrix:**	SOIL

Analyses	Result	Reporting Limit	Units	Dilution Factor	Date Prepared	Date Analyzed	Batch ID	Analyst	Qual	Notes
VOLATILES BY GC/MS			**SW8260B**							
1,1,1,2-Tetrachloroethane	ND	0.0100	mg/Kg	1	11/20/2003	11/20/2003	R22373	KAL		
1,1,1-Trichloroethane	ND	0.0100	mg/Kg	1						
1,1,2,2-Tetrachloroethane	ND	0.0100	mg/Kg	1						
1,1,2-Trichloroethane	ND	0.0100	mg/Kg	1						
1,1-Dichloroethane	ND	0.0500	mg/Kg	1						
1,1-Dichloroethene	ND	0.0100	mg/Kg	1						
1,1-Dichloropropene	ND	0.0100	mg/Kg	1						
1,2,3-Trichlorobenzene	ND	0.0100	mg/Kg	1						
1,2,3-Trichloropropane	ND	0.0100	mg/Kg	1						
1,2,4-Trichlorobenzene	ND	0.0500	mg/Kg	1						
1,2,4-Trimethylbenzene	ND	0.0100	mg/Kg	1						
1,2-Dibromo-3-chloropropane	ND	0.0100	mg/Kg	1						
1,2-Dibromoethane	ND	0.0100	mg/Kg	1						
1,2-Dichlorobenzene	ND	0.0500	mg/Kg	1						
1,2-Dichloroethane	ND	0.0100	mg/Kg	1						
1,2-Dichloropropane	ND	0.0100	mg/Kg	1						
1,3,5-Trimethylbenzene	ND	0.0100	mg/Kg	1						
1,3-Dichlorobenzene	ND	0.0500	mg/Kg	1						
1,3-Dichloropropane	ND	0.0100	mg/Kg	1						
1,4-Dichlorobenzene	ND	0.0500	mg/Kg	1						
2,2-Dichloropropane	ND	0.0100	mg/Kg	1						
2-Butanone	ND	0.0500	mg/Kg	1						
2-Chlorotoluene	ND	0.0100	mg/Kg	1						
2-Hexanone	ND	0.0500	mg/Kg	1						
4-Chlorotoluene	ND	0.0100	mg/Kg	1						
4-Isopropyltoluene	ND	0.0100	mg/Kg	1						
4-Methyl-2-pentanone	ND	0.0500	mg/Kg	1						
Acetone	ND	0.0500	mg/Kg	1						
Acrylonitrile	ND	0.0500	mg/Kg	1						
Benzene	ND	0.0100	mg/Kg	1						
Bromobenzene	ND	0.0100	mg/Kg	1						
Bromochloromethane	ND	0.0500	mg/Kg	1						
Bromodichloromethane	ND	0.0100	mg/Kg	1						
Bromoform	ND	0.0100	mg/Kg	1						
Bromomethane	ND	0.100	mg/Kg	1						
Carbon disulfide	ND	0.0100	mg/Kg	1						
Carbon tetrachloride	ND	0.0100	mg/Kg	1						
Chlorobenzene	ND	0.0100	mg/Kg	1						
Chloroethane	ND	0.0500	mg/Kg	1						
Chloroform	ND	0.0100	mg/Kg	1						

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

* - Value exceeds Maximum Contaminant Level

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

Oceanic Analytical Laboratory, Inc.

Date: *Dec 02, 2003*

(ient:	Edward K. Noda & Associates	**Client Sample ID:**	N9-10.0
Lab Order:	0311088	**Tag Number:**	
I' oject:	Upgrade Electrical System, Phase 1, Hickam AFB	**Collection Date:**	11/11/2003 9:10
I b ID:	0311088-02B	**Matrix:**	SOIL

alyses	Result	Reporting Limit	Units	Dilution Factor	Date Prepared	Date Analyzed	Batch ID	Analyst	Qual	Notes
ıloromethane	ND	0.0500	mg/Kg	1						
cis-1,2-Dichloroethene	ND	0.0100	mg/Kg	1						
-'s-1,3-Dichloropropene	ND	0.0100	mg/Kg	1						
ibromochloromethane	ND	0.0100	mg/Kg	1						
Dibromomethane	ND	0.0100	mg/Kg	1						
Dichlorodifluoromethane	ND	0.0500	mg/Kg	1						
thylbenzene	ND	0.0100	mg/Kg	1						
exachlorobutadiene	ND	0.0500	mg/Kg	1						
Iodomethane	ND	0.0500	mg/Kg	1						
opropylbenzene	ND	0.0100	mg/Kg	1						
,p-Xylene	ND	0.0100	mg/Kg	1						
Methyl tert-butyl ether	ND	0.00500	mg/Kg	1						
Methylene chloride	ND	0.0500	mg/Kg	1						
·Butylbenzene	ND	0.0100	mg/Kg	1						
..·Propylbenzene	ND	0.0100	mg/Kg	1						
Naphthalene	ND	0.0500	mg/Kg	1						
·Xylene	ND	0.0100	mg/Kg	1						
ec-Butylbenzene	ND	0.0100	mg/Kg	1						
Styrene	ND	0.0100	mg/Kg	1						
t·rt-Butylbenzene	ND	0.0100	mg/Kg	1						
etrachloroethene	ND	0.0100	mg/Kg	1						
ı oluene	ND	0.0100	mg/Kg	1						
trans-1,2-Dichloroethene	ND	0.0100	mg/Kg	1						
ans-1,3-Dichloropropene	ND	0.0100	mg/Kg	1						
ans-1,4-Dichloro-2-butene	ND	0.0500	mg/Kg	1						
Trichloroethene	ND	0.0100	mg/Kg	1						
richlorofluoromethane	ND	0.0100	mg/Kg	1						
'inyl acetate	ND	0.0500	mg/Kg	1						
Vinyl chloride	ND	0.0500	mg/Kg	1						
Surr: 1,2-Dichloroethane-d4	113	58-180	%REC	1						
Surr: 4-Bromofluorobenzene	126	69-173	%REC	1						
Surr: Dibromofluoromethane	101	71-142	%REC	1						
Surr: Toluene-d8	104	87-126	%REC	1						

Qualifiers:

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
* - Value exceeds Maximum Contaminant Level
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range

Oceanic Analytical Laboratory, Inc.

Date: *Dec 02, 2003*

Client:	Edward K. Noda & Associates	**Client Sample ID:**	N8-3.0
Lab Order:	0311088	**Tag Number:**	
Project:	Upgrade Electrical System, Phase 1, Hickam AFB	**Collection Date:**	11/11/2003 10:08
Lab ID:	0311088-03A	**Matrix:**	SOIL

Analyses	Result	Reporting Limit	Units	Dilution Factor	Date Prepared	Date Analyzed	Batch ID	Analyst	Qual	Notes
ICP METALS, TCLP LEACHED			**SW1311/6010B**							
Arsenic	ND	0.500	mg/L	1	11/21/2003	11/22/2003	8417	TKL		
Barium	***3.40***	1.00	mg/L	1						
Cadmium	ND	0.0500	mg/L	1						
Chromium	ND	0.100	mg/L	1						
Lead	ND	0.200	mg/L	1						
Selenium	ND	0.500	mg/L	1						
Silver	ND	0.200	mg/L	1						
ICP METALS-RCRA, TOTAL			**SW6010B**							
Arsenic	ND	5.00	mg/Kg	1	11/21/2003	11/21/2003	8413	TKL		
Cadmium	ND	2.00	mg/Kg	1						
Chromium	***160***	5.00	mg/Kg	1						
Lead	ND	20.0	mg/Kg	1						
MERCURY, TCLP LEACHED			**SW1311/7470**							
Mercury	ND	0.00250	mg/L	1	11/25/2003	11/25/2003	8440	SYL		
PAH BY EPA 8270 SIM			**SW8270C**							
Acenaphthene	ND	0.00667	mg/Kg	1	11/17/2003	11/26/2003	8367	SLK		
Benzo(a)pyrene	ND	0.00667	mg/Kg	1						
Fluoranthene	ND	0.00667	mg/Kg	1						
Naphthalene	ND	0.00667	mg/Kg	1						
Surr: 2-Fluorobiphenyl	53.0	30-115	%REC	1						
Surr: 4-Terphenyl-d14	62.8	18-137	%REC	1						
Surr: Nitrobenzene-d5	51.2	23-120	%REC	1						
PCBS IN SOIL OR SOLID WASTE			**SW8082**							
Aroclor 1016	ND	0.0333	mg/Kg	1	11/18/2003	11/19/2003	8378	SLK		
Aroclor 1221	ND	0.0667	mg/Kg	1						
Aroclor 1232	ND	0.0333	mg/Kg	1						
Aroclor 1242	ND	0.0333	mg/Kg	1						
Aroclor 1248	ND	0.0333	mg/Kg	1						
Aroclor 1254	ND	0.0333	mg/Kg	1						
Aroclor 1260	ND	0.0333	mg/Kg	1						
Surr: Decachlorobiphenyl	113	24-154	%REC	1						

Qualifiers:

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
* - Value exceeds Maximum Contaminant Level
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range

Oceanic Analytical Laboratory, Inc.

Date: *Dec 02, 2003*

lient:	Edward K. Noda & Associates	**Client Sample ID:**	N8-3.0
Lab Order:	0311088	**Tag Number:**	
·oject:	Upgrade Electrical System, Phase 1, Hickam AFB	**Collection Date:**	11/11/2003 10:08
ab ID:	0311088-03A	**Matrix:**	SOIL

ıalyses	Result	Reporting Limit	Units	Dilution Factor	Date Prepared	Date Analyzed	Batch ID	Analyst	Qual	Notes
..PH (FUEL FINGERPRINT)			**SW8015M**							
TPH (Diesel)	ND	5.00	mg/Kg	1	11/17/2003	11/18/2003	8368	MDH		
·PH (Jet A)	ND	5.00	mg/Kg	1						
·PH (JP-4)	ND	5.00	mg/Kg	1						
TPH (JP-5)	ND	5.00	mg/Kg	1						
TPH (Kerosene)	ND	5.00	mg/Kg	1						
·PH (Motor Oil)	ND	20.0	mg/Kg	1						
;PH (Paint Thinner)	ND	5.00	mg/Kg	1						
TPH (Unidentifed Hydrocarbons as Diesel)	ND	5.00	mg/Kg	1						
·PH (Unidentifed Hydrocarbons as Motor Oil)	ND	20.0	mg/Kg	1						
Surr: Pentacosane	72.7	31-152	%REC	1						

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

* - Value exceeds Maximum Contaminant Level

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

Oceanic Analytical Laboratory, Inc.

Date: *Dec 02, 2003*

Client:	Edward K. Noda & Associates	**Client Sample ID:**	N8-3.0
Lab Order:	0311088	**Tag Number:**	
Project:	Upgrade Electrical System, Phase 1, Hickam AFB	**Collection Date:**	11/11/2003 10:08
Lab ID:	0311088-03B	**Matrix:**	SOIL

Analyses	Result	Reporting Limit	Units	Dilution Factor	Date Prepared	Date Analyzed	Batch ID	Analyst	Qual	Notes
TPH GASOLINE W/BTEX			**SW5030/8015M/8021B**							
Benzene	*0.0191*	0.00200	mg/Kg	1	11/20/2003	11/20/2003	R22368	SJR		
Ethylbenzene	ND	0.00200	mg/Kg	1						
m,p-Xylene	ND	0.00400	mg/Kg	1						
o-Xylene	ND	0.00200	mg/Kg	1						
Toluene	ND	0.00200	mg/Kg	1						
TPH (Gasoline C6-C12)	ND	0.200	mg/Kg	1						
Surr: a,a,a-Trifluorotoluene	64.2	54-126	%REC	1						

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

* - Value exceeds Maximum Contaminant Level

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

Oceanic Analytical Laboratory, Inc.

Date: *Dec 02, 2003*

(ent:	Edward K. Noda & Associates	Client Sample ID:	N8-3.0
Lab Order:	0311088	Tag Number:	
I oject:	Upgrade Electrical System, Phase 1, Hickam AFB	Collection Date:	11/11/2003 10:08
L..b ID:	0311088-03B	Matrix:	SOIL

alyses	Result	Reporting Limit	Units	Dilution Factor	Date Prepared	Date Analyzed	Batch ID	Analyst	Qual	Notes
VOLATILES BY GC/MS			SW8260B							
1,1,1,2-Tetrachloroethane	ND	0.0100	mg/Kg	1	11/20/2003	11/20/2003	R22373	KAL		
1,1-Trichloroethane	ND	0.0100	mg/Kg	1						
1,2,2-Tetrachloroethane	ND	0.0100	mg/Kg	1						
1,1,2-Trichloroethane	ND	0.0100	mg/Kg	1						
1-Dichloroethane	ND	0.0500	mg/Kg	1						
1-Dichloroethene	ND	0.0100	mg/Kg	1						
,1-Dichloropropene	ND	0.0100	mg/Kg	1						
1,2,3-Trichlorobenzene	ND	0.0100	mg/Kg	1						
2,3-Trichloropropane	ND	0.0100	mg/Kg	1						
,2,4-Trichlorobenzene	ND	0.0500	mg/Kg	1						
1,2,4-Trimethylbenzene	ND	0.0100	mg/Kg	1						
,2-Dibromo-3-chloropropane	ND	0.0100	mg/Kg	1						
,2-Dibromoethane	ND	0.0100	mg/Kg	1						
1,2-Dichlorobenzene	ND	0.0500	mg/Kg	1						
1,2-Dichloroethane	ND	0.0100	mg/Kg	1						
,2-Dichloropropane	ND	0.0100	mg/Kg	1						
,3,5-Trimethylbenzene	ND	0.0100	mg/Kg	1						
1,3-Dichlorobenzene	ND	0.0500	mg/Kg	1						
,3-Dichloropropane	ND	0.0100	mg/Kg	1						
,4-Dichlorobenzene	ND	0.0500	mg/Kg	1						
2,2-Dichloropropane	ND	0.0100	mg/Kg	1						
?-Butanone	ND	0.0500	mg/Kg	1						
-Chlorotoluene	ND	0.0100	mg/Kg	1						
2-Hexanone	ND	0.0500	mg/Kg	1						
4-Chlorotoluene	ND	0.0100	mg/Kg	1						
-Isopropyltoluene	ND	0.0100	mg/Kg	1						
-Methyl-2-pentanone	ND	0.0500	mg/Kg	1						
Acetone	*0.169*	0.0500	mg/Kg	1						
Acrylonitrile	ND	0.0500	mg/Kg	1						
Benzene	ND	0.0100	mg/Kg	1						
Bromobenzene	ND	0.0100	mg/Kg	1						
Bromochloromethane	ND	0.0500	mg/Kg	1						
Bromodichloromethane	ND	0.0100	mg/Kg	1						
Bromoform	ND	0.0100	mg/Kg	1						
Bromomethane	ND	0.100	mg/Kg	1						
Carbon disulfide	ND	0.0100	mg/Kg	1						
Carbon tetrachloride	ND	0.0100	mg/Kg	1						
Chlorobenzene	ND	0.0100	mg/Kg	1						
Chloroethane	ND	0.0500	mg/Kg	1						
Chloroform	ND	0.0100	mg/Kg	1						

Qualifiers:
- ND - Not Detected at the Reporting Limit
- J - Analyte detected below quantitation limits
- B - Analyte detected in the associated Method Blank
- * - Value exceeds Maximum Contaminant Level
- S - Spike Recovery outside accepted recovery limits
- R - RPD outside accepted recovery limits
- E - Value above quantitation range

Oceanic Analytical Laboratory, Inc.

Date: *Dec 02, 2003*

Client:	Edward K. Noda & Associates	**Client Sample ID:**	N8-3.0
Lab Order:	0311088	**Tag Number:**	
Project:	Upgrade Electrical System, Phase 1, Hickam AFB	**Collection Date:**	11/11/2003 10:08
Lab ID:	0311088-03B	**Matrix:**	SOIL

Analyses	Result	Reporting Limit	Units	Dilution Factor	Date Prepared	Date Analyzed	Batch ID	Analyst	Qual	Notes
Chloromethane	ND	0.0500	mg/Kg	1						
cis-1,2-Dichloroethene	ND	0.0100	mg/Kg	1						
cis-1,3-Dichloropropene	ND	0.0100	mg/Kg	1						
Dibromochloromethane	ND	0.0100	mg/Kg	1						
Dibromomethane	ND	0.0100	mg/Kg	1						
Dichlorodifluoromethane	ND	0.0500	mg/Kg	1						
Ethylbenzene	ND	0.0100	mg/Kg	1						
Hexachlorobutadiene	ND	0.0500	mg/Kg	1						
Iodomethane	ND	0.0500	mg/Kg	1						
Isopropylbenzene	ND	0.0100	mg/Kg	1						
m,p-Xylene	ND	0.0100	mg/Kg	1						
Methyl tert-butyl ether	ND	0.00500	mg/Kg	1						
Methylene chloride	ND	0.0500	mg/Kg	1						
n-Butylbenzene	ND	0.0100	mg/Kg	1						
n-Propylbenzene	ND	0.0100	mg/Kg	1						
Naphthalene	ND	0.0500	mg/Kg	1						
o-Xylene	ND	0.0100	mg/Kg	1						
sec-Butylbenzene	ND	0.0100	mg/Kg	1						
Styrene	ND	0.0100	mg/Kg	1						
tert-Butylbenzene	ND	0.0100	mg/Kg	1						
Tetrachloroethene	ND	0.0100	mg/Kg	1						
Toluene	ND	0.0100	mg/Kg	1						
trans-1,2-Dichloroethene	ND	0.0100	mg/Kg	1						
trans-1,3-Dichloropropene	ND	0.0100	mg/Kg	1						
trans-1,4-Dichloro-2-butene	ND	0.0500	mg/Kg	1						
Trichloroethene	ND	0.0100	mg/Kg	1						
Trichlorofluoromethane	ND	0.0100	mg/Kg	1						
Vinyl acetate	ND	0.0500	mg/Kg	1						
Vinyl chloride	ND	0.0500	mg/Kg	1						
Surr: 1,2-Dichloroethane-d4	121	58-180	%REC	1						
Surr: 4-Bromofluorobenzene	168	69-173	%REC	1						
Surr: Dibromofluoromethane	117	71-142	%REC	1						
Surr: Toluene-d8	124	87-126	%REC	1						

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

* - Value exceeds Maximum Contaminant Level

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

Oceanic Analytical Laboratory, Inc.

Date: *Dec 02, 2003*

Client:	Edward K. Noda & Associates	**Client Sample ID:**	N8-10.0
Lab Order:	0311088	**Tag Number:**	
Project:	Upgrade Electrical System, Phase 1, Hickam AFB	**Collection Date:**	11/11/2003 10:20
Lab ID:	0311088-04A	**Matrix:**	SOIL

Analyses	Result	Reporting Limit	Units	Dilution Factor	Date Prepared	Date Analyzed	Batch ID	Analyst	Qual	Notes
ICP METALS, TCLP LEACHED			**SW1311/6010B**							
Arsenic	ND	0.500	mg/L	1	11/21/2003	11/22/2003	8417	TKL		
Barium	ND	1.00	mg/L	1						
Cadmium	ND	0.0500	mg/L	1						
Chromium	ND	0.100	mg/L	1						
Lead	ND	0.200	mg/L	1						
Selenium	ND	0.500	mg/L	1						
Silver	ND	0.200	mg/L	1						
ICP METALS-RCRA, TOTAL			**SW6010B**							
Arsenic	ND	5.00	mg/Kg	1	11/21/2003	11/21/2003	8413	TKL		
Cadmium	ND	2.00	mg/Kg	1						
Chromium	*77.6*	5.00	mg/Kg	1						
Lead	ND	20.0	mg/Kg	1						
MERCURY, TCLP LEACHED			**SW1311/7470**							
Mercury	ND	0.00250	mg/L	1	11/25/2003	11/25/2003	8440	SYL		
PAH BY EPA 8270 SIM			**SW8270C**							
Acenaphthene	ND	0.00667	mg/Kg	1	11/17/2003	11/26/2003	8367	SLK		
Benzo(a)pyrene	ND	0.00667	mg/Kg	1						
Fluoranthene	ND	0.00667	mg/Kg	1						
Naphthalene	ND	0.00667	mg/Kg	1						
Surr: 2-Fluorobiphenyl	52.3	30-115	%REC	1						
Surr: 4-Terphenyl-d14	53.1	18-137	%REC	1						
Surr: Nitrobenzene-d5	51.9	23-120	%REC	1						
PCBS IN SOIL OR SOLID WASTE			**SW8082**							
Aroclor 1016	ND	0.0333	mg/Kg	1	11/18/2003	11/19/2003	8378	SLK		
Aroclor 1221	ND	0.0667	mg/Kg	1						
Aroclor 1232	ND	0.0333	mg/Kg	1						
Aroclor 1242	ND	0.0333	mg/Kg	1						
Aroclor 1248	ND	0.0333	mg/Kg	1						
Aroclor 1254	ND	0.0333	mg/Kg	1						
Aroclor 1260	ND	0.0333	mg/Kg	1						
Surr: Decachlorobiphenyl	105	24-154	%REC	1						

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

* - Value exceeds Maximum Contaminant Level

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

Oceanic Analytical Laboratory, Inc.

Date: *Dec 02, 2003*

Client:	Edward K. Noda & Associates	**Client Sample ID:**	N8-10.0
Lab Order:	0311088	**Tag Number:**	
Project:	Upgrade Electrical System, Phase 1, Hickam AFB	**Collection Date:**	11/11/2003 10:20
Lab ID:	0311088-04A	**Matrix:**	SOIL

Analyses	Result	Reporting Limit	Units	Dilution Factor	Date Prepared	Date Analyzed	Batch ID	Analyst	Qual	Notes
TPH (FUEL FINGERPRINT)			**SW8015M**							
TPH (Diesel)	ND	5.00	mg/Kg	1	11/17/2003	11/18/2003	8368	MDH		
TPH (Jet A)	ND	5.00	mg/Kg	1						
TPH (JP-4)	ND	5.00	mg/Kg	1						
TPH (JP-5)	ND	5.00	mg/Kg	1						
TPH (Kerosene)	ND	5.00	mg/Kg	1						
TPH (Motor Oil)	ND	20.0	mg/Kg	1						
TPH (Paint Thinner)	ND	5.00	mg/Kg	1						
TPH (Unidentifed Hydrocarbons as Diesel)	ND	5.00	mg/Kg	1						
TPH (Unidentifed Hydrocarbons as Motor Oil)	ND	20.0	mg/Kg	1						
Surr: Pentacosane	76.3	31-152	%REC	1						

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

* - Value exceeds Maximum Contaminant Level

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

Oceanic Analytical Laboratory, Inc.

Date: *Dec 02, 2003*

lient:	Edward K. Noda & Associates	**Client Sample ID:**	N8-10.0
Lab Order:	0311088	**Tag Number:**	
roject:	Upgrade Electrical System, Phase 1, Hickam AFB	**Collection Date:**	11/11/2003 10:20
ab ID:	0311088-04B	**Matrix:**	SOIL

nalyses	Result	Reporting Limit	Units	Dilution Factor	Date Prepared	Date Analyzed	Batch ID	Analyst	Qual	Notes
PH GASOLINE W/BTEX			**SW5030/8015M/8021B**							
Benzene	ND	0.0100	mg/Kg	1	11/21/2003	11/21/2003	R22388	SJR		
thylbenzene	ND	0.0100	mg/Kg	1						
n,p-Xylene	ND	0.0200	mg/Kg	1						
o-Xylene	ND	0.0100	mg/Kg	1						
Toluene	ND	0.0100	mg/Kg	1						
PH (Gasoline C6-C12)	*1.41*	1.00	mg/Kg	1						
Surr: a,a,a-Trifluorotoluene	97.7	54-126	%REC	1						

Qualifiers:

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B - Analyte detected in the associated Method Blank

* - Value exceeds Maximum Contaminant Level

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

Oceanic Analytical Laboratory, Inc.

Date: *Dec 02, 2003*

Client:	Edward K. Noda & Associates	**Client Sample ID:**	N8-10.0
Lab Order:	0311088	**Tag Number:**	
Project:	Upgrade Electrical System, Phase 1, Hickam AFB	**Collection Date:**	11/11/2003 10:20
Lab ID:	0311088-04B	**Matrix:**	SOIL

Analyses	Result	Reporting Limit	Units	Dilution Factor	Date Prepared	Date Analyzed	Batch ID	Analyst	Qual	Notes
VOLATILES BY GC/MS			SW8260B							
1,1,1,2-Tetrachloroethane	ND	0.0100	mg/Kg	1	11/20/2003	11/20/2003	R22373	KAL		
1,1,1-Trichloroethane	ND	0.0100	mg/Kg	1						
1,1,2,2-Tetrachloroethane	ND	0.0100	mg/Kg	1						
1,1,2-Trichloroethane	ND	0.0100	mg/Kg	1						
1,1-Dichloroethane	ND	0.0500	mg/Kg	1						
1,1-Dichloroethene	ND	0.0100	mg/Kg	1						
1,1-Dichloropropene	ND	0.0100	mg/Kg	1						
1,2,3-Trichlorobenzene	ND	0.0100	mg/Kg	1						
1,2,3-Trichloropropane	ND	0.0100	mg/Kg	1						
1,2,4-Trichlorobenzene	ND	0.0500	mg/Kg	1						
1,2,4-Trimethylbenzene	ND	0.0100	mg/Kg	1						
1,2-Dibromo-3-chloropropane	ND	0.0100	mg/Kg	1						
1,2-Dibromoethane	ND	0.0100	mg/Kg	1						
1,2-Dichlorobenzene	ND	0.0500	mg/Kg	1						
1,2-Dichloroethane	ND	0.0100	mg/Kg	1						
1,2-Dichloropropane	ND	0.0100	mg/Kg	1						
1,3,5-Trimethylbenzene	ND	0.0100	mg/Kg	1						
1,3-Dichlorobenzene	ND	0.0500	mg/Kg	1						
1,3-Dichloropropane	ND	0.0100	mg/Kg	1						
1,4-Dichlorobenzene	ND	0.0500	mg/Kg	1						
2,2-Dichloropropane	ND	0.0100	mg/Kg	1						
2-Butanone	ND	0.0500	mg/Kg	1						
2-Chlorotoluene	ND	0.0100	mg/Kg	1						
2-Hexanone	ND	0.0500	mg/Kg	1						
4-Chlorotoluene	ND	0.0100	mg/Kg	1						
4-Isopropyltoluene	ND	0.0100	mg/Kg	1						
4-Methyl-2-pentanone	ND	0.0500	mg/Kg	1						
Acetone	ND	0.0500	mg/Kg	1						
Acrylonitrile	ND	0.0500	mg/Kg	1						
Benzene	ND	0.0100	mg/Kg	1						
Bromobenzene	ND	0.0100	mg/Kg	1						
Bromochloromethane	ND	0.0500	mg/Kg	1						
Bromodichloromethane	ND	0.0100	mg/Kg	1						
Bromoform	ND	0.0100	mg/Kg	1						
Bromomethane	ND	0.100	mg/Kg	1						
Carbon disulfide	ND	0.0100	mg/Kg	1						
Carbon tetrachloride	ND	0.0100	mg/Kg	1						
Chlorobenzene	ND	0.0100	mg/Kg	1						
Chloroethane	ND	0.0500	mg/Kg	1						
Chloroform	ND	0.0100	mg/Kg	1						

Qualifiers:

ND - Not Detected at the Reporting Limit

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B - Analyte detected in the associated Method Blank

* - Value exceeds Maximum Contaminant Level

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

Oceanic Analytical Laboratory, Inc.

Date: *Dec 02, 2003*

ient:	Edward K. Noda & Associates	**Client Sample ID:**	N8-10.0
Lab Order:	0311088	**Tag Number:**	
oject:	Upgrade Electrical System, Phase 1, Hickam AFB	**Collection Date:**	11/11/2003 10:20
ıb ID:	0311088-04B	**Matrix:**	SOIL

ıalyses	Result	Reporting Limit	Units	Dilution Factor	Date Prepared	Date Analyzed	Batch ID	Analyst	Qual	Notes
hloromethane	ND	0.0500	mg/Kg	1						
cis-1,2-Dichloroethene	ND	0.0100	mg/Kg	1						
s-1,3-Dichloropropene	ND	0.0100	mg/Kg	1						
ibromochloromethane	ND	0.0100	mg/Kg	1						
Dibromomethane	ND	0.0100	mg/Kg	1						
Dichlorodifluoromethane	ND	0.0500	mg/Kg	1						
thylbenzene	ND	0.0100	mg/Kg	1						
exachlorobutadiene	ND	0.0500	mg/Kg	1						
Iodomethane	ND	0.0500	mg/Kg	1						
opropylbenzene	ND	0.0100	mg/Kg	1						
ı,p-Xylene	ND	0.0100	mg/Kg	1						
Methyl tert-butyl ether	ND	0.00500	mg/Kg	1						
Methylene chloride	ND	0.0500	mg/Kg	1						
-Butylbenzene	ND	0.0100	mg/Kg	1						
n-Propylbenzene	ND	0.0100	mg/Kg	1						
Naphthalene	ND	0.0500	mg/Kg	1						
-Xylene	ND	0.0100	mg/Kg	1						
ec-Butylbenzene	ND	0.0100	mg/Kg	1						
Styrene	ND	0.0100	mg/Kg	1						
ert-Butylbenzene	ND	0.0100	mg/Kg	1						
etrachloroethene	ND	0.0100	mg/Kg	1						
Toluene	ND	0.0100	mg/Kg	1						
trans-1,2-Dichloroethene	ND	0.0100	mg/Kg	1						
ans-1,3-Dichloropropene	ND	0.0100	mg/Kg	1						
rans-1,4-Dichloro-2-butene	ND	0.0500	mg/Kg	1						
Trichloroethene	ND	0.0100	mg/Kg	1						
richlorofluoromethane	ND	0.0100	mg/Kg	1						
inyl acetate	ND	0.0500	mg/Kg	1						
Vinyl chloride	ND	0.0500	mg/Kg	1						
Surr: 1,2-Dichloroethane-d4	109	58-180	%REC	1						
Surr: 4-Bromofluorobenzene	121	69-173	%REC	1						
Surr: Dibromofluoromethane	96.2	71-142	%REC	1						
Surr: Toluene-d8	103	87-126	%REC	1						

Qualifiers:

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J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

* - Value exceeds Maximum Contaminant Level

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

Oceanic Analytical Laboratory, Inc.

Date: *Dec 02, 2003*

Client:	Edward K. Noda & Associates	**Client Sample ID:**	N7-2.0
Lab Order:	0311088	**Tag Number:**	
Project:	Upgrade Electrical System, Phase 1, Hickam AFB	**Collection Date:**	11/11/2003 11:10
Lab ID:	0311088-05A	**Matrix:**	SOIL

Analyses	Result	Reporting Limit	Units	Dilution Factor	Date Prepared	Date Analyzed	Batch ID	Analyst	Qual	Notes
ICP METALS, TCLP LEACHED			**SW1311/6010B**							
Arsenic	ND	0.500	mg/L	1	11/26/2003	11/26/2003	8449	TKL		
Barium	ND	1.00	mg/L	1						
Cadmium	ND	0.0500	mg/L	1						
Chromium	ND	0.100	mg/L	1						
Lead	ND	0.200	mg/L	1						
Selenium	ND	0.500	mg/L	1						
Silver	ND	0.200	mg/L	1						
ICP METALS-RCRA, TOTAL			**SW6010B**							
Arsenic	ND	5.00	mg/Kg	1	11/21/2003	11/21/2003	8413	TKL		
Cadmium	ND	2.00	mg/Kg	1						
Chromium	*149*	5.00	mg/Kg	1						
Lead	ND	20.0	mg/Kg	1						
MERCURY, TCLP LEACHED			**SW1311/7470**							
Mercury	ND	0.00250	mg/L	1	11/25/2003	11/25/2003	8440	SYL		
PAH BY EPA 8270 SIM			**SW8270C**							
Acenaphthene	ND	0.00667	mg/Kg	1	11/17/2003	11/26/2003	8367	SLK		
Benzo(a)pyrene	ND	0.00667	mg/Kg	1						
Fluoranthene	ND	0.00667	mg/Kg	1						
Naphthalene	ND	0.00667	mg/Kg	1						
Surr: 2-Fluorobiphenyl	48.7	30-115	%REC	1						
Surr: 4-Terphenyl-d14	52.7	18-137	%REC	1						
Surr: Nitrobenzene-d5	43.5	23-120	%REC	1						
PCBS IN SOIL OR SOLID WASTE			**SW8082**							
Aroclor 1016	ND	0.0333	mg/Kg	1	11/18/2003	11/19/2003	8378	SLK		
Aroclor 1221	ND	0.0667	mg/Kg	1						
Aroclor 1232	ND	0.0333	mg/Kg	1						
Aroclor 1242	ND	0.0333	mg/Kg	1						
Aroclor 1248	ND	0.0333	mg/Kg	1						
Aroclor 1254	ND	0.0333	mg/Kg	1						
Aroclor 1260	ND	0.0333	mg/Kg	1						
Surr: Decachlorobiphenyl	107	24-154	%REC	1						

Qualifiers:

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
* - Value exceeds Maximum Contaminant Level
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range

Oceanic Analytical Laboratory, Inc.

Date: *Dec 02, 2003*

Client:	Edward K. Noda & Associates	**Client Sample ID:**	N7-2.0
Lab Order:	0311088	**Tag Number:**	
Project:	Upgrade Electrical System, Phase 1, Hickam AFB	**Collection Date:**	11/11/2003 11:10
Lab ID:	0311088-05A	**Matrix:**	SOIL

Analyses	Result	Reporting Limit	Units	Dilution Factor	Date Prepared	Date Analyzed	Batch ID	Analyst	Qual	Notes
TPH (FUEL FINGERPRINT)			**SW8015M**							
TPH (Diesel)	ND	5.00	mg/Kg	1	11/17/2003	11/19/2003	8368	MDH		
TPH (Jet A)	ND	5.00	mg/Kg	1						
TPH (JP-4)	ND	5.00	mg/Kg	1						
TPH (JP-5)	ND	5.00	mg/Kg	1						
TPH (Kerosene)	ND	5.00	mg/Kg	1						
TPH (Motor Oil)	ND	20.0	mg/Kg	1						
TPH (Paint Thinner)	ND	5.00	mg/Kg	1						
TPH (Unidentifed Hydrocarbons as Diesel)	ND	5.00	mg/Kg	1						
TPH (Unidentifed Hydrocarbons as Motor Oil)	ND	20.0	mg/Kg	1						
Surr: Pentacosane	73.0	31-152	%REC	1						

Qualifiers:

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- * - Value exceeds Maximum Contaminant Level
- S - Spike Recovery outside accepted recovery limits
- R - RPD outside accepted recovery limits
- E - Value above quantitation range

Oceanic Analytical Laboratory, Inc.

Date: *Dec 02, 2003*

Client:	Edward K. Noda & Associates	**Client Sample ID:**	N7-2.0
Lab Order:	0311088	**Tag Number:**	
Project:	Upgrade Electrical System, Phase 1, Hickam AFB	**Collection Date:**	11/11/2003 11:10
Lab ID:	0311088-05B	**Matrix:**	SOIL

Analyses	Result	Reporting Limit	Units	Dilution Factor	Date Prepared	Date Analyzed	Batch ID	Analyst	Qual	Notes
TPH GASOLINE W/BTEX			**SW5030/8015M/8021B**							
Benzene	ND	0.0100	mg/Kg	1	11/21/2003	11/21/2003	R22388	SJR		
Ethylbenzene	ND	0.0100	mg/Kg	1						
m,p-Xylene	ND	0.0200	mg/Kg	1						
o-Xylene	ND	0.0100	mg/Kg	1						
Toluene	ND	0.0100	mg/Kg	1						
TPH (Gasoline C6-C12)	ND	1.00	mg/Kg	1						
Surr: a,a,a-Trifluorotoluene	97.3	54-126	%REC	1						

Qualifiers:

ND - Not Detected at the Reporting Limit

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B - Analyte detected in the associated Method Blank

* - Value exceeds Maximum Contaminant Level

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

Oceanic Analytical Laboratory, Inc.

Date: *Dec 02, 2003*

Cl nt:	Edward K. Noda & Associates	Client Sample ID:	N7-2.0
Lab Order:	0311088	Tag Number:	
Pr ect:	Upgrade Electrical System, Phase 1, Hickam AFB	Collection Date:	11/11/2003 11:10
Lab ID:	0311088-05B	Matrix:	SOIL

An yses	Result	Reporting Limit	Units	Dilution Factor	Date Prepared	Date Analyzed	Batch ID	Analyst	Qual	Notes
VOLATILES BY GC/MS			SW8260B							
1,1,1,2-Tetrachloroethane	ND	0.0100	mg/Kg	1	11/20/2003	11/20/2003	R22373	KAL		
1, 1-Trichloroethane	ND	0.0100	mg/Kg	1						
1, 2,2-Tetrachloroethane	ND	0.0100	mg/Kg	1						
1,1,2-Trichloroethane	ND	0.0100	mg/Kg	1						
1,1 Dichloroethane	ND	0.0500	mg/Kg	1						
1 Dichloroethene	ND	0.0100	mg/Kg	1						
1,1-Dichloropropene	ND	0.0100	mg/Kg	1						
1,2,3-Trichlorobenzene	ND	0.0100	mg/Kg	1						
1 3-Trichloropropane	ND	0.0100	mg/Kg	1						
1 4-Trichlorobenzene	ND	0.0500	mg/Kg	1						
1,2,4-Trimethylbenzene	ND	0.0100	mg/Kg	1						
1 Dibromo-3-chloropropane	ND	0.0100	mg/Kg	1						
1 Dibromoethane	ND	0.0100	mg/Kg	1						
1,2-Dichlorobenzene	ND	0.0500	mg/Kg	1						
1,2-Dichloroethane	ND	0.0100	mg/Kg	1						
1 Dichloropropane	ND	0.0100	mg/Kg	1						
1,,5-Trimethylbenzene	ND	0.0100	mg/Kg	1						
1,3-Dichlorobenzene	ND	0.0500	mg/Kg	1						
1 Dichloropropane	ND	0.0100	mg/Kg	1						
1 Dichlorobenzene	ND	0.0500	mg/Kg	1						
2,2-Dichloropropane	ND	0.0100	mg/Kg	1						
2 Butanone	ND	0.0500	mg/Kg	1						
2 hlorotoluene	ND	0.0100	mg/Kg	1						
2-Hexanone	ND	0.0500	mg/Kg	1						
4-Chlorotoluene	ND	0.0100	mg/Kg	1						
4 sopropyltoluene	ND	0.0100	mg/Kg	1						
4 lethyl-2-pentanone	ND	0.0500	mg/Kg	1						
Acetone	ND	0.0500	mg/Kg	1						
A ylonitrile	ND	0.0500	mg/Kg	1						
B nzene	ND	0.0100	mg/Kg	1						
Bromobenzene	ND	0.0100	mg/Kg	1						
Bromochloromethane	ND	0.0500	mg/Kg	1						
B modichloromethane	ND	0.0100	mg/Kg	1						
Bromoform	ND	0.0100	mg/Kg	1						
Bromomethane	ND	0.100	mg/Kg	1						
C rbon disulfide	ND	0.0100	mg/Kg	1						
C rbon tetrachloride	ND	0.0100	mg/Kg	1						
Chlorobenzene	ND	0.0100	mg/Kg	1						
C loroethane	ND	0.0500	mg/Kg	1						
C loroform	ND	0.0100	mg/Kg	1						

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

* - Value exceeds Maximum Contaminant Level

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

Oceanic Analytical Laboratory, Inc.

Date: *Dec 02, 2003*

Client:	Edward K. Noda & Associates	**Client Sample ID:**	N7-2.0
Lab Order:	0311088	**Tag Number:**	
Project:	Upgrade Electrical System, Phase 1, Hickam AFB	**Collection Date:**	11/11/2003 11:10
Lab ID:	0311088-05B	**Matrix:**	SOIL

Analyses	Result	Reporting Limit	Units	Dilution Factor	Date Prepared	Date Analyzed	Batch ID	Analyst	Qual	Notes
Chloromethane	ND	0.0500	mg/Kg	1						
cis-1,2-Dichloroethene	ND	0.0100	mg/Kg	1						
cis-1,3-Dichloropropene	ND	0.0100	mg/Kg	1						
Dibromochloromethane	ND	0.0100	mg/Kg	1						
Dibromomethane	ND	0.0100	mg/Kg	1						
Dichlorodifluoromethane	ND	0.0500	mg/Kg	1						
Ethylbenzene	ND	0.0100	mg/Kg	1						
Hexachlorobutadiene	ND	0.0500	mg/Kg	1						
Iodomethane	ND	0.0500	mg/Kg	1						
Isopropylbenzene	ND	0.0100	mg/Kg	1						
m,p-Xylene	ND	0.0100	mg/Kg	1						
Methyl tert-butyl ether	ND	0.00500	mg/Kg	1						
Methylene chloride	ND	0.0500	mg/Kg	1						
n-Butylbenzene	ND	0.0100	mg/Kg	1						
n-Propylbenzene	ND	0.0100	mg/Kg	1						
Naphthalene	ND	0.0500	mg/Kg	1						
o-Xylene	ND	0.0100	mg/Kg	1						
sec-Butylbenzene	ND	0.0100	mg/Kg	1						
Styrene	ND	0.0100	mg/Kg	1						
tert-Butylbenzene	ND	0.0100	mg/Kg	1						
Tetrachloroethene	ND	0.0100	mg/Kg	1						
Toluene	ND	0.0100	mg/Kg	1						
trans-1,2-Dichloroethene	ND	0.0100	mg/Kg	1						
trans-1,3-Dichloropropene	ND	0.0100	mg/Kg	1						
trans-1,4-Dichloro-2-butene	ND	0.0500	mg/Kg	1						
Trichloroethene	ND	0.0100	mg/Kg	1						
Trichlorofluoromethane	ND	0.0100	mg/Kg	1						
Vinyl acetate	ND	0.0500	mg/Kg	1						
Vinyl chloride	ND	0.0500	mg/Kg	1						
Surr: 1,2-Dichloroethane-d4	112	58-180	%REC	1						
Surr: 4-Bromofluorobenzene	131	69-173	%REC	1						
Surr: Dibromofluoromethane	104	71-142	%REC	1						
Surr: Toluene-d8	110	87-126	%REC	1						

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

* - Value exceeds Maximum Contaminant Level

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

Oceanic Analytical Laboratory, Inc.

Date: *Dec 02, 2003*

ient:	Edward K. Noda & Associates	**Client Sample ID:**	N7-10.0
Lab Order:	0311088	**Tag Number:**	
˜ ·oject:	Upgrade Electrical System, Phase 1, Hickam AFB	**Collection Date:**	11/11/2003 11:25
ıb ID:	0311088-06A	**Matrix:**	SOIL

ıalyses	Result	Reporting Limit	Units	Dilution Factor	Date Prepared	Date Analyzed	Batch ID	Analyst	Qual	Notes
P METALS, TCLP LEACHED			**SW1311/6010B**							
Arsenic	ND	0.500	mg/L	1	11/26/2003	11/26/2003	8449	TKL		
˜arium	ND	1.00	mg/L	1						
·admium	ND	0.0500	mg/L	1						
Chromium	ND	0.100	mg/L	1						
Lead	ND	0.200	mg/L	1						
elenium	ND	0.500	mg/L	1						
ilver	ND	0.200	mg/L	1						
ICP METALS-RCRA, TOTAL			**SW6010B**							
.rsenic	ND	5.00	mg/Kg	1	11/21/2003	11/21/2003	8413	TKL		
⌣admium	ND	2.00	mg/Kg	1						
Chromium	*60.2*	5.00	mg/Kg	1						
ead	ND	20.0	mg/Kg	1						
ıııERCURY, TCLP LEACHED			**SW1311/7470**							
Mercury	ND	0.00250	mg/L	1	11/25/2003	11/25/2003	8440	SYL		
ɅH BY EPA 8270 SIM			**SW8270C**							
⌒cenaphthene	ND	0.00667	mg/Kg	1	11/17/2003	11/26/2003	8367	SLK		
Benzo(a)pyrene	ND	0.00667	mg/Kg	1						
'luoranthene	ND	0.00667	mg/Kg	1						
ǀaphthalene	ND	0.00667	mg/Kg	1						
Surr: 2-Fluorobiphenyl	53.0	30-115	%REC	1						
Surr: 4-Terphenyl-d14	57.5	18-137	%REC	1						
Surr: Nitrobenzene-d5	52.8	23-120	%REC	1						
PCBS IN SOIL OR SOLID WASTE			**SW8082**							
\roclor 1016	ND	0.0333	mg/Kg	1	11/18/2003	11/19/2003	8378	SLK		
\roclor 1221	ND	0.0667	mg/Kg	1						
Aroclor 1232	ND	0.0333	mg/Kg	1						
Aroclor 1242	ND	0.0333	mg/Kg	1						
\roclor 1248	ND	0.0333	mg/Kg	1						
,Aroclor 1254	ND	0.0333	mg/Kg	1						
Aroclor 1260	ND	0.0333	mg/Kg	1						
Surr: Decachlorobiphenyl	120	24-154	%REC	1						

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

* - Value exceeds Maximum Contaminant Level

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

Oceanic Analytical Laboratory, Inc.

Date: *Dec 02, 2003*

Client:	Edward K. Noda & Associates	**Client Sample ID:**	N7-10.0
Lab Order:	0311088	**Tag Number:**	
Project:	Upgrade Electrical System, Phase 1, Hickam AFB	**Collection Date:**	11/11/2003 11:25
Lab ID:	0311088-06A	**Matrix:**	SOIL

Analyses	Result	Reporting Limit	Units	Dilution Factor	Date Prepared	Date Analyzed	Batch ID	Analyst	Qual	Notes
TPH (FUEL FINGERPRINT)			**SW8015M**							
TPH (Diesel)	ND	5.00	mg/Kg	1	11/17/2003	11/19/2003	8368	MDH		
TPH (Jet A)	ND	5.00	mg/Kg	1						
TPH (JP-4)	ND	5.00	mg/Kg	1						
TPH (JP-5)	ND	5.00	mg/Kg	1						
TPH (Kerosene)	ND	5.00	mg/Kg	1						
TPH (Motor Oil)	ND	20.0	mg/Kg	1						
TPH (Paint Thinner)	ND	5.00	mg/Kg	1						
TPH (Unidentifed Hydrocarbons as Diesel)	ND	5.00	mg/Kg	1						
TPH (Unidentifed Hydrocarbons as Motor Oil)	ND	20.0	mg/Kg	1						
Surr: Pentacosane	74.1	31-152	%REC	1						

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

* - Value exceeds Maximum Contaminant Level

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

Oceanic Analytical Laboratory, Inc.

Date: *Dec 02, 2003*

(ent:	Edward K. Noda & Associates	**Client Sample ID:**	N7-10.0
Lab Order:	0311088	**Tag Number:**	
I)ject:	Upgrade Electrical System, Phase 1, Hickam AFB	**Collection Date:**	11/11/2003 11:25
L..b ID:	0311088-06B	**Matrix:**	SOIL

/ ılyses	Result	Reporting Limit	Units	Dilution Factor	Date Prepared	Date Analyzed	Batch ID	Analyst	Qual	Notes
T. H GASOLINE W/BTEX			**SW5030/8015M/8021B**							
Benzene	ND	0.0100	mg/Kg	1	11/21/2003	11/21/2003	R22388	SJR		
hylbenzene	ND	0.0100	mg/Kg	1						
p-Xylene	ND	0.0200	mg/Kg	1						
o-Xylene	ND	0.0100	mg/Kg	1						
Tnluene	ND	0.0100	mg/Kg	1						
'H (Gasoline C6-C12)	ND	1.00	mg/Kg	1						
Surr: a,a,a-Trifluorotoluene	99.6	54-126	%REC	1						

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

* - Value exceeds Maximum Contaminant Level

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

Oceanic Analytical Laboratory, Inc.

Date: *Dec 02, 2003*

Client:	Edward K. Noda & Associates	**Client Sample ID:**	N7-10.0
Lab Order:	0311088	**Tag Number:**	
Project:	Upgrade Electrical System, Phase 1, Hickam AFB	**Collection Date:**	11/11/2003 11:25
Lab ID:	0311088-06B	**Matrix:**	SOIL

Analyses	Result	Reporting Limit	Units	Dilution Factor	Date Prepared	Date Analyzed	Batch ID	Analyst	Qual	Notes
VOLATILES BY GC/MS			SW8260B							
1,1,1,2-Tetrachloroethane	ND	0.0100	mg/Kg	1	11/20/2003	11/20/2003	R22373	KAL		
1,1,1-Trichloroethane	ND	0.0100	mg/Kg	1						
1,1,2,2-Tetrachloroethane	ND	0.0100	mg/Kg	1						
1,1,2-Trichloroethane	ND	0.0100	mg/Kg	1						
1,1-Dichloroethane	ND	0.0500	mg/Kg	1						
1,1-Dichloroethene	ND	0.0100	mg/Kg	1						
1,1-Dichloropropene	ND	0.0100	mg/Kg	1						
1,2,3-Trichlorobenzene	ND	0.0100	mg/Kg	1						
1,2,3-Trichloropropane	ND	0.0100	mg/Kg	1						
1,2,4-Trichlorobenzene	ND	0.0500	mg/Kg	1						
1,2,4-Trimethylbenzene	ND	0.0100	mg/Kg	1						
1,2-Dibromo-3-chloropropane	ND	0.0100	mg/Kg	1						
1,2-Dibromoethane	ND	0.0100	mg/Kg	1						
1,2-Dichlorobenzene	ND	0.0500	mg/Kg	1						
1,2-Dichloroethane	ND	0.0100	mg/Kg	1						
1,2-Dichloropropane	ND	0.0100	mg/Kg	1						
1,3,5-Trimethylbenzene	ND	0.0100	mg/Kg	1						
1,3-Dichlorobenzene	ND	0.0500	mg/Kg	1						
1,3-Dichloropropane	ND	0.0100	mg/Kg	1						
1,4-Dichlorobenzene	ND	0.0500	mg/Kg	1						
2,2-Dichloropropane	ND	0.0100	mg/Kg	1						
2-Butanone	ND	0.0500	mg/Kg	1						
2-Chlorotoluene	ND	0.0100	mg/Kg	1						
2-Hexanone	ND	0.0500	mg/Kg	1						
4-Chlorotoluene	ND	0.0100	mg/Kg	1						
4-Isopropyltoluene	ND	0.0100	mg/Kg	1						
4-Methyl-2-pentanone	ND	0.0500	mg/Kg	1						
Acetone	ND	0.0500	mg/Kg	1						
Acrylonitrile	ND	0.0500	mg/Kg	1						
Benzene	ND	0.0100	mg/Kg	1						
Bromobenzene	ND	0.0100	mg/Kg	1						
Bromochloromethane	ND	0.0500	mg/Kg	1						
Bromodichloromethane	ND	0.0100	mg/Kg	1						
Bromoform	ND	0.0100	mg/Kg	1						
Bromomethane	ND	0.100	mg/Kg	1						
Carbon disulfide	ND	0.0100	mg/Kg	1						
Carbon tetrachloride	ND	0.0100	mg/Kg	1						
Chlorobenzene	ND	0.0100	mg/Kg	1						
Chloroethane	ND	0.0500	mg/Kg	1						
Chloroform	ND	0.0100	mg/Kg	1						

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

* - Value exceeds Maximum Contaminant Level

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

Oceanic Analytical Laboratory, Inc.

Date: *Dec 02, 2003*

C ent:	Edward K. Noda & Associates	**Client Sample ID:**	N7-10.0
Lab Order:	0311088	**Tag Number:**	
P oject:	Upgrade Electrical System, Phase 1, Hickam AFB	**Collection Date:**	11/11/2003 11:25
L b ID:	0311088-06B	**Matrix:**	SOIL

A alyses	Result	Reporting Limit	Units	Dilution Factor	Date Prepared	Date Analyzed	Batch ID	Analyst	Qual	Notes
loromethane	ND	0.0500	mg/Kg	1						
cis-1,2-Dichloroethene	ND	0.0100	mg/Kg	1						
-1,3-Dichloropropene	ND	0.0100	mg/Kg	1						
oromochloromethane	ND	0.0100	mg/Kg	1						
Dibromomethane	ND	0.0100	mg/Kg	1						
Dichlorodifluoromethane	ND	0.0500	mg/Kg	1						
hylbenzene	ND	0.0100	mg/Kg	1						
xachlorobutadiene	ND	0.0500	mg/Kg	1						
Iodomethane	ND	0.0500	mg/Kg	1						
opropylbenzene	ND	0.0100	mg/Kg	1						
p-Xylene	ND	0.0100	mg/Kg	1						
Methyl tert-butyl ether	ND	0.00500	mg/Kg	1						
Methylene chloride	ND	0.0500	mg/Kg	1						
Butylbenzene	ND	0.0100	mg/Kg	1						
Propylbenzene	ND	0.0100	mg/Kg	1						
Naphthalene	ND	0.0500	mg/Kg	1						
Xylene	ND	0.0100	mg/Kg	1						
c-Butylbenzene	ND	0.0100	mg/Kg	1						
Styrene	ND	0.0100	mg/Kg	1						
rt-Butylbenzene	ND	0.0100	mg/Kg	1						
trachloroethene	ND	0.0100	mg/Kg	1						
oluene	ND	0.0100	mg/Kg	1						
trans-1,2-Dichloroethene	ND	0.0100	mg/Kg	1						
ns-1,3-Dichloropropene	ND	0.0100	mg/Kg	1						
ns-1,4-Dichloro-2-butene	ND	0.0500	mg/Kg	1						
Trichloroethene	ND	0.0100	mg/Kg	1						
ichlorofluoromethane	ND	0.0100	mg/Kg	1						
nyl acetate	ND	0.0500	mg/Kg	1						
Vinyl chloride	ND	0.0500	mg/Kg	1						
Surr: 1,2-Dichloroethane-d4	115	58-180	%REC	1						
Surr: 4-Bromofluorobenzene	119	69-173	%REC	1						
Surr: Dibromofluoromethane	93.3	71-142	%REC	1						
Surr: Toluene-d8	105	87-126	%REC	1						

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

* - Value exceeds Maximum Contaminant Level

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

Oceanic Analytical Laboratory, Inc.

Date: *Dec 02, 2003*

Client:	Edward K. Noda & Associates	**Client Sample ID:**	N6-3.0
Lab Order:	0311088	**Tag Number:**	
Project:	Upgrade Electrical System, Phase 1, Hickam AFB	**Collection Date:**	11/11/2003 12:57
Lab ID:	0311088-07A	**Matrix:**	SOIL

Analyses	Result	Reporting Limit	Units	Dilution Factor	Date Prepared	Date Analyzed	Batch ID	Analyst	Qual	Notes
ICP METALS, TCLP LEACHED			SW1311/6010B							
Arsenic	ND	0.500	mg/L	1	11/26/2003	11/26/2003	8449	TKL		
Barium	ND	1.00	mg/L	1						
Cadmium	ND	0.0500	mg/L	1						
Chromium	ND	0.100	mg/L	1						
Lead	ND	0.200	mg/L	1						
Selenium	ND	0.500	mg/L	1						
Silver	ND	0.200	mg/L	1						
ICP METALS-RCRA, TOTAL			SW6010B							
Arsenic	ND	5.00	mg/Kg	1	11/21/2003	11/21/2003	8413	TKL		
Cadmium	ND	2.00	mg/Kg	1						
Chromium	ND	5.00	mg/Kg	1						
Lead	ND	20.0	mg/Kg	1						
MERCURY, TCLP LEACHED			SW1311/7470							
Mercury	ND	0.00250	mg/L	1	11/25/2003	11/25/2003	8440	SYL		
PAH BY EPA 8270 SIM			SW8270C							
Acenaphthene	ND	0.00667	mg/Kg	1	11/17/2003	11/26/2003	8367	SLK		
Benzo(a)pyrene	ND	0.00667	mg/Kg	1						
Fluoranthene	ND	0.00667	mg/Kg	1						
Naphthalene	ND	0.00667	mg/Kg	1						
Surr: 2-Fluorobiphenyl	52.3	30-115	%REC	1						
Surr: 4-Terphenyl-d14	53.3	18-137	%REC	1						
Surr: Nitrobenzene-d5	50.4	23-120	%REC	1						
PCBS IN SOIL OR SOLID WASTE			SW8082							
Aroclor 1016	ND	0.0333	mg/Kg	1	11/18/2003	11/19/2003	8378	SLK		
Aroclor 1221	ND	0.0667	mg/Kg	1						
Aroclor 1232	ND	0.0333	mg/Kg	1						
Aroclor 1242	ND	0.0333	mg/Kg	1						
Aroclor 1248	ND	0.0333	mg/Kg	1						
Aroclor 1254	ND	0.0333	mg/Kg	1						
Aroclor 1260	ND	0.0333	mg/Kg	1						
Surr: Decachlorobiphenyl	108	24-154	%REC	1						

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

* - Value exceeds Maximum Contaminant Level

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

Oceanic Analytical Laboratory, Inc.

Date: *Dec 02, 2003*

C ent:	Edward K. Noda & Associates	**Client Sample ID:**	N6-3.0
Lab Order:	0311088	**Tag Number:**	
P ject:	Upgrade Electrical System, Phase 1, Hickam AFB	**Collection Date:**	11/11/2003 12:57
L b ID:	0311088-07A	**Matrix:**	SOIL

A alyses	Result	Reporting Limit	Units	Dilution Factor	Date Prepared	Date Analyzed	Batch ID	Analyst	Qual	Notes
T H (FUEL FINGERPRINT)			**SW8015M**							
TPH (Diesel)	ND	5.00	mg/Kg	1	11/17/2003	11/19/2003	8368	MDH		
TPH (Jet A)	ND	5.00	mg/Kg	1						
H (JP-4)	ND	5.00	mg/Kg	1						
TPH (JP-5)	ND	5.00	mg/Kg	1						
TPH (Kerosene)	ND	5.00	mg/Kg	1						
H (Motor Oil)	ND	20.0	mg/Kg	1						
H (Paint Thinner)	ND	5.00	mg/Kg	1						
TPH (Unidentifed Hydrocarbons as Diesel)	ND	5.00	mg/Kg	1						
H (Unidentifed Hydrocarbons as otor Oil)	ND	20.0	mg/Kg	1						
Surr: Pentacosane	68.0	31-152	%REC	1						

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

* - Value exceeds Maximum Contaminant Level

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

Client:	Edward K. Noda & Associates	**Client Sample ID:**	N6-3.0
Lab Order:	0311088	**Tag Number:**	
Project:	Upgrade Electrical System, Phase 1, Hickam AFB	**Collection Date:**	11/11/2003 12:57
Lab ID:	0311088-07B	**Matrix:**	SOIL

Analyses	Result	Reporting Limit	Units	Dilution Factor	Date Prepared	Date Analyzed	Batch ID	Analyst	Qual	Notes
TPH GASOLINE W/BTEX			**SW5030/8015M/8021B**							
Benzene	ND	0.0100	mg/Kg	1	11/21/2003	11/21/2003	R22388	SJR		
Ethylbenzene	ND	0.0100	mg/Kg	1						
m,p-Xylene	ND	0.0200	mg/Kg	1						
o-Xylene	ND	0.0100	mg/Kg	1						
Toluene	ND	0.0100	mg/Kg	1						
TPH (Gasoline C6-C12)	ND	1.00	mg/Kg	1						
Surr: a,a,a-Trifluorotoluene	94.8	54-126	%REC	1						

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

* - Value exceeds Maximum Contaminant Level

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

Oceanic Analytical Laboratory, Inc.

Date: *Dec 02, 2003*

ient:	Edward K. Noda & Associates	**Client Sample ID:**	N6-3.0
Lab Order:	0311088	**Tag Number:**	
'oject:	Upgrade Electrical System, Phase 1, Hickam AFB	**Collection Date:**	11/11/2003 12:57
ıb ID:	0311088-07B	**Matrix:**	SOIL

ıalyses	Result	Reporting Limit	Units	Dilution Factor	Date Prepared	Date Analyzed	Batch ID	Analyst	Qual	Notes
.)LATILES BY GC/MS			**SW8260B**							
1,1,1,2-Tetrachloroethane	ND	0.0100	mg/Kg	1	11/21/2003	11/21/2003	R22373	KAL		
',1,1-Trichloroethane	ND	0.0100	mg/Kg	1						
,1,2,2-Tetrachloroethane	ND	0.0100	mg/Kg	1						
1,1,2-Trichloroethane	ND	0.0100	mg/Kg	1						
1,1-Dichloroethane	ND	0.0500	mg/Kg	1						
,1-Dichloroethene	ND	0.0100	mg/Kg	1						
.,1-Dichloropropene	ND	0.0100	mg/Kg	1						
1,2,3-Trichlorobenzene	ND	0.0100	mg/Kg	1						
,2,3-Trichloropropane	ND	0.0100	mg/Kg	1						
,2,4-Trichlorobenzene	ND	0.0500	mg/Kg	1						
1,2,4-Trimethylbenzene	ND	0.0100	mg/Kg	1						
1,2-Dibromo-3-chloropropane	ND	0.0100	mg/Kg	1						
,2-Dibromoethane	ND	0.0100	mg/Kg	1						
ı,2-Dichlorobenzene	ND	0.0500	mg/Kg	1						
1,2-Dichloroethane	ND	0.0100	mg/Kg	1						
,2-Dichloropropane	ND	0.0100	mg/Kg	1						
,3,5-Trimethylbenzene	ND	0.0100	mg/Kg	1						
1,3-Dichlorobenzene	ND	0.0500	mg/Kg	1						
',3-Dichloropropane	ND	0.0100	mg/Kg	1						
,4-Dichlorobenzene	ND	0.0500	mg/Kg	1						
2,2-Dichloropropane	ND	0.0100	mg/Kg	1						
2-Butanone	ND	0.0500	mg/Kg	1						
-Chlorotoluene	ND	0.0100	mg/Kg	1						
_-Hexanone	ND	0.0500	mg/Kg	1						
4-Chlorotoluene	ND	0.0100	mg/Kg	1						
-Isopropyltoluene	ND	0.0100	mg/Kg	1						
-Methyl-2-pentanone	ND	0.0500	mg/Kg	1						
Acetone	ND	0.0500	mg/Kg	1						
Acrylonitrile	ND	0.0500	mg/Kg	1						
3enzene	ND	0.0100	mg/Kg	1						
Bromobenzene	ND	0.0100	mg/Kg	1						
Bromochloromethane	ND	0.0500	mg/Kg	1						
3romodichloromethane	ND	0.0100	mg/Kg	1						
3romoform	ND	0.0100	mg/Kg	1						
Bromomethane	ND	0.100	mg/Kg	1						
Carbon disulfide	ND	0.0100	mg/Kg	1						
Carbon tetrachloride	ND	0.0100	mg/Kg	1						
Chlorobenzene	ND	0.0100	mg/Kg	1						
Chloroethane	ND	0.0500	mg/Kg	1						
Chloroform	ND	0.0100	mg/Kg	1						

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

* - Value exceeds Maximum Contaminant Level

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

Oceanic Analytical Laboratory, Inc.

Date: *Dec 02, 2003*

Client:	Edward K. Noda & Associates	**Client Sample ID:**	N6-3.0
Lab Order:	0311088	**Tag Number:**	
Project:	Upgrade Electrical System, Phase 1, Hickam AFB	**Collection Date:**	11/11/2003 12:57
Lab ID:	0311088-07B	**Matrix:**	SOIL

Analyses	Result	Reporting Limit	Units	Dilution Factor	Date Prepared	Date Analyzed	Batch ID	Analyst	Qual	Notes
Chloromethane	ND	0.0500	mg/Kg	1						
cis-1,2-Dichloroethene	ND	0.0100	mg/Kg	1						
cis-1,3-Dichloropropene	ND	0.0100	mg/Kg	1						
Dibromochloromethane	ND	0.0100	mg/Kg	1						
Dibromomethane	ND	0.0100	mg/Kg	1						
Dichlorodifluoromethane	ND	0.0500	mg/Kg	1						
Ethylbenzene	ND	0.0100	mg/Kg	1						
Hexachlorobutadiene	ND	0.0500	mg/Kg	1						
Iodomethane	ND	0.0500	mg/Kg	1						
Isopropylbenzene	ND	0.0100	mg/Kg	1						
m,p-Xylene	ND	0.0100	mg/Kg	1						
Methyl tert-butyl ether	ND	0.00500	mg/Kg	1						
Methylene chloride	ND	0.0500	mg/Kg	1						
n-Butylbenzene	ND	0.0100	mg/Kg	1						
n-Propylbenzene	ND	0.0100	mg/Kg	1						
Naphthalene	ND	0.0500	mg/Kg	1						
o-Xylene	ND	0.0100	mg/Kg	1						
sec-Butylbenzene	ND	0.0100	mg/Kg	1						
Styrene	ND	0.0100	mg/Kg	1						
tert-Butylbenzene	ND	0.0100	mg/Kg	1						
Tetrachloroethene	ND	0.0100	mg/Kg	1						
Toluene	ND	0.0100	mg/Kg	1						
trans-1,2-Dichloroethene	ND	0.0100	mg/Kg	1						
trans-1,3-Dichloropropene	ND	0.0100	mg/Kg	1						
trans-1,4-Dichloro-2-butene	ND	0.0500	mg/Kg	1						
Trichloroethene	ND	0.0100	mg/Kg	1						
Trichlorofluoromethane	ND	0.0100	mg/Kg	1						
Vinyl acetate	ND	0.0500	mg/Kg	1						
Vinyl chloride	ND	0.0500	mg/Kg	1						
Surr: 1,2-Dichloroethane-d4	122	58-180	%REC	1						
Surr: 4-Bromofluorobenzene	127	69-173	%REC	1						
Surr: Dibromofluoromethane	105	71-142	%REC	1						
Surr: Toluene-d8	108	87-126	%REC	1						

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

* - Value exceeds Maximum Contaminant Level

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

Oceanic Analytical Laboratory, Inc.

Date: *Dec 02, 2003*

(ient:	Edward K. Noda & Associates	**Client Sample ID:**	N6-10.0
Lab Order:	0311088	**Tag Number:**	
F oject:	Upgrade Electrical System, Phase 1, Hickam AFB	**Collection Date:**	11/11/2003 13:06
I b ID:	0311088-08A	**Matrix:**	SOIL

alyses	Result	Reporting Limit	Units	Dilution Factor	Date Prepared	Date Analyzed	Batch ID	Analyst	Qual	Notes
I . ? METALS, TCLP LEACHED			**SW1311/6010B**							
Arsenic	ND	0.500	mg/L	1	11/26/2003	11/26/2003	8449	TKL		
arium	ND	1.00	mg/L	1						
admium	ND	0.0500	mg/L	1						
Chromium	ND	0.100	mg/L	1						
Lead	ND	0.200	mg/L	1						
elenium	ND	0.500	mg/L	1						
lver	ND	0.200	mg/L	1						
ICP METALS-RCRA, TOTAL			**SW6010B**							
senic	***6.62***	5.00	mg/Kg	1	11/21/2003	11/21/2003	8413	TKL		
admium	ND	2.00	mg/Kg	1						
Chromium	***135***	5.00	mg/Kg	1						
ad	ND	20.0	mg/Kg	1						
MERCURY, TCLP LEACHED			**SW1311/7470**							
Mercury	ND	0.00250	mg/L	1	11/25/2003	11/25/2003	8440	SYL		
F .H BY EPA 8270 SIM			**SW8270C**							
Acenaphthene	ND	0.00667	mg/Kg	1	11/17/2003	11/26/2003	8367	SLK		
Benzo(a)pyrene	ND	0.00667	mg/Kg	1						
oranthene	ND	0.00667	mg/Kg	1						
aphthalene	ND	0.00667	mg/Kg	1						
Surr: 2-Fluorobiphenyl	51.4	30-115	%REC	1						
Surr: 4-Terphenyl-d14	56.5	18-137	%REC	1						
Surr: Nitrobenzene-d5	50.5	23-120	%REC	1						
PCBS IN SOIL OR SOLID WASTE			**SW8082**							
oclor 1016	ND	0.0330	mg/Kg	1	11/21/2003	11/21/2003	8408	SLK		
oclor 1221	ND	0.0660	mg/Kg	1						
Aroclor 1232	ND	0.0330	mg/Kg	1						
Aroclor 1242	ND	0.0330	mg/Kg	1						
oclor 1248	ND	0.0330	mg/Kg	1						
oclor 1254	ND	0.0330	mg/Kg	1						
Aroclor 1260	ND	0.0330	mg/Kg	1						
Surr: Decachlorobiphenyl	96.0	24-154	%REC	1						

Qualifiers:

- ND - Not Detected at the Reporting Limit
- J - Analyte detected below quantitation limits
- B - Analyte detected in the associated Method Blank
- * - Value exceeds Maximum Contaminant Level
- S - Spike Recovery outside accepted recovery limits
- R - RPD outside accepted recovery limits
- E - Value above quantitation range

Oceanic Analytical Laboratory, Inc.

Date: *Dec 02, 2003*

Client:	Edward K. Noda & Associates	**Client Sample ID:**	N6-10.0
Lab Order:	0311088	**Tag Number:**	
Project:	Upgrade Electrical System, Phase 1, Hickam AFB	**Collection Date:**	11/11/2003 13:06
Lab ID:	0311088-08A	**Matrix:**	SOIL

Analyses	Result	Reporting Limit	Units	Dilution Factor	Date Prepared	Date Analyzed	Batch ID	Analyst	Qual	Notes
TPH (FUEL FINGERPRINT)			**SW8015M**							
TPH (Diesel)	ND	5.00	mg/Kg	1	11/17/2003	11/19/2003	8368	MDH		
TPH (Jet A)	ND	5.00	mg/Kg	1						
TPH (JP-4)	ND	5.00	mg/Kg	1						
TPH (JP-5)	ND	5.00	mg/Kg	1						
TPH (Kerosene)	ND	5.00	mg/Kg	1						
TPH (Motor Oil)	ND	20.0	mg/Kg	1						
TPH (Paint Thinner)	ND	5.00	mg/Kg	1						
TPH (Unidentifed Hydrocarbons as Diesel)	ND	5.00	mg/Kg	1						
TPH (Unidentifed Hydrocarbons as Motor Oil)	ND	20.0	mg/Kg	1						
Surr: Pentacosane	66.9	31-152	%REC	1						

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

* - Value exceeds Maximum Contaminant Level

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

Oceanic Analytical Laboratory, Inc.

Date: *Dec 02, 2003*

(ent:	Edward K. Noda & Associates	**Client Sample ID:**	N6-10.0
Lab Order:	0311088	**Tag Number:**	
I ɔject:	Upgrade Electrical System, Phase 1, Hickam AFB	**Collection Date:**	11/11/2003 13:06
I b ID:	0311088-08B	**Matrix:**	SOIL

⁄ alyses	Result	Reporting Limit	Units	Dilution Factor	Date Prepared	Date Analyzed	Batch ID	Analyst	Qual	Notes
1. H GASOLINE W/BTEX			**SW5030/8015M/8021B**							
Benzene	ND	0.0100	mg/Kg	1	11/21/2003	11/21/2003	R22388	SJR		
‾ hylbenzene	ND	0.0100	mg/Kg	1						
,p-Xylene	ND	0.0200	mg/Kg	1						
o-Xylene	ND	0.0100	mg/Kg	1						
Toluene	ND	0.0100	mg/Kg	1						
ᵓH (Gasoline C6-C12)	ND	1.00	mg/Kg	1						
Surr: a,a,a-Trifluorotoluene	95.1	54-126	%REC	1						

Qualifiers:	ND - Not Detected at the Reporting Limit	S - Spike Recovery outside accepted recovery limits
	J - Analyte detected below quantitation limits	R - RPD outside accepted recovery limits
	B - Analyte detected in the associated Method Blank	E - Value above quantitation range
	* - Value exceeds Maximum Contaminant Level	

Oceanic Analytical Laboratory, Inc.

Date: *Dec 02, 2003*

Client:	Edward K. Noda & Associates	**Client Sample ID:**	N6-10.0
Lab Order:	0311088	**Tag Number:**	
Project:	Upgrade Electrical System, Phase 1, Hickam AFB	**Collection Date:**	11/11/2003 13:06
Lab ID:	0311088-08B	**Matrix:**	SOIL

Analyses	Result	Reporting Limit	Units	Dilution Factor	Date Prepared	Date Analyzed	Batch ID	Analyst	Qual	Notes
VOLATILES BY GC/MS			**SW8260B**							
1,1,1,2-Tetrachloroethane	ND	0.0100	mg/Kg	1	11/21/2003	11/21/2003	R22378	KAL		
1,1,1-Trichloroethane	ND	0.0100	mg/Kg	1						
1,1,2,2-Tetrachloroethane	ND	0.0100	mg/Kg	1						
1,1,2-Trichloroethane	ND	0.0100	mg/Kg	1						
1,1-Dichloroethane	ND	0.0500	mg/Kg	1						
1,1-Dichloroethene	ND	0.0100	mg/Kg	1						
1,1-Dichloropropene	ND	0.0100	mg/Kg	1						
1,2,3-Trichlorobenzene	ND	0.0100	mg/Kg	1						
1,2,3-Trichloropropane	ND	0.0100	mg/Kg	1						
1,2,4-Trichlorobenzene	ND	0.0500	mg/Kg	1						
1,2,4-Trimethylbenzene	ND	0.0100	mg/Kg	1						
1,2-Dibromo-3-chloropropane	ND	0.0100	mg/Kg	1						
1,2-Dibromoethane	ND	0.0100	mg/Kg	1						
1,2-Dichlorobenzene	ND	0.0500	mg/Kg	1						
1,2-Dichloroethane	ND	0.0100	mg/Kg	1						
1,2-Dichloropropane	ND	0.0100	mg/Kg	1						
1,3,5-Trimethylbenzene	ND	0.0100	mg/Kg	1						
1,3-Dichlorobenzene	ND	0.0500	mg/Kg	1						
1,3-Dichloropropane	ND	0.0100	mg/Kg	1						
1,4-Dichlorobenzene	ND	0.0500	mg/Kg	1						
2,2-Dichloropropane	ND	0.0100	mg/Kg	1						
2-Butanone	ND	0.0500	mg/Kg	1						
2-Chlorotoluene	ND	0.0100	mg/Kg	1						
2-Hexanone	ND	0.0500	mg/Kg	1						
4-Chlorotoluene	ND	0.0100	mg/Kg	1						
4-Isopropyltoluene	ND	0.0100	mg/Kg	1						
4-Methyl-2-pentanone	ND	0.0500	mg/Kg	1						
Acetone	ND	0.0500	mg/Kg	1						
Acrylonitrile	ND	0.0500	mg/Kg	1						
Benzene	ND	0.0100	mg/Kg	1						
Bromobenzene	ND	0.0100	mg/Kg	1						
Bromochloromethane	ND	0.0500	mg/Kg	1						
Bromodichloromethane	ND	0.0100	mg/Kg	1						
Bromoform	ND	0.0100	mg/Kg	1						
Bromomethane	ND	0.100	mg/Kg	1						
Carbon disulfide	ND	0.0100	mg/Kg	1						
Carbon tetrachloride	ND	0.0100	mg/Kg	1						
Chlorobenzene	ND	0.0100	mg/Kg	1						
Chloroethane	ND	0.0500	mg/Kg	1						
Chloroform	ND	0.0100	mg/Kg	1						

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

* - Value exceeds Maximum Contaminant Level

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

Oceanic Analytical Laboratory, Inc.

Date: *Dec 02, 2003*

ient:	Edward K. Noda & Associates	**Client Sample ID:**	N6-10.0
Lab Order:	0311088	**Tag Number:**	
oject:	Upgrade Electrical System, Phase 1, Hickam AFB	**Collection Date:**	11/11/2003 13:06
ıb ID:	0311088-08B	**Matrix:**	SOIL

ıalyses	Result	Reporting Limit	Units	Dilution Factor	Date Prepared	Date Analyzed	Batch ID	Analyst	Qual	Notes
hloromethane	ND	0.0500	mg/Kg	1						
cis-1,2-Dichloroethene	ND	0.0100	mg/Kg	1						
's-1,3-Dichloropropene	ND	0.0100	mg/Kg	1						
ibromochloromethane	ND	0.0100	mg/Kg	1						
Dibromomethane	ND	0.0100	mg/Kg	1						
Dichlorodifluoromethane	ND	0.0500	mg/Kg	1						
thylbenzene	ND	0.0100	mg/Kg	1						
..exachlorobutadiene	ND	0.0500	mg/Kg	1						
Iodomethane	ND	0.0500	mg/Kg	1						
opropylbenzene	ND	0.0100	mg/Kg	1						
,p-Xylene	ND	0.0100	mg/Kg	1						
Methyl tert-butyl ether	ND	0.00500	mg/Kg	1						
Methylene chloride	ND	0.0500	mg/Kg	1						
Butylbenzene	ND	0.0100	mg/Kg	1						
n-Propylbenzene	ND	0.0100	mg/Kg	1						
Naphthalene	ND	0.0500	mg/Kg	1						
Xylene	ND	0.0100	mg/Kg	1						
ɔc-Butylbenzene	ND	0.0100	mg/Kg	1						
Styrene	ND	0.0100	mg/Kg	1						
rt-Butylbenzene	ND	0.0100	mg/Kg	1						
ɔtrachloroethene	ND	0.0100	mg/Kg	1						
Toluene	ND	0.0100	mg/Kg	1						
trans-1,2-Dichloroethene	ND	0.0100	mg/Kg	1						
ans-1,3-Dichloropropene	ND	0.0100	mg/Kg	1						
..ans-1,4-Dichloro-2-butene	ND	0.0500	mg/Kg	1						
Trichloroethene	ND	0.0100	mg/Kg	1						
ichlorofluoromethane	ND	0.0100	mg/Kg	1						
nyl acetate	ND	0.0500	mg/Kg	1						
Vinyl chloride	ND	0.0500	mg/Kg	1						
Surr: 1,2-Dichloroethane-d4	106	58-180	%REC	1						
Surr: 4-Bromofluorobenzene	118	69-173	%REC	1						
Surr: Dibromofluoromethane	100	71-142	%REC	1						
Surr: Toluene-d8	112	87-126	%REC	1						

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

* - Value exceeds Maximum Contaminant Level

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

Oceanic Analytical Laboratory, Inc.

Date: *Dec 02, 2003*

Client:	Edward K. Noda & Associates	**Client Sample ID:**	N5-3.0
Lab Order:	0311088	**Tag Number:**	
Project:	Upgrade Electrical System, Phase 1, Hickam AFB	**Collection Date:**	11/11/2003 14:04
Lab ID:	0311088-09A	**Matrix:**	SOIL

Analyses	Result	Reporting Limit	Units	Dilution Factor	Date Prepared	Date Analyzed	Batch ID	Analyst	Qual	Notes
ICP METALS, TCLP LEACHED			SW1311/6010B							
Arsenic	ND	0.500	mg/L	1	11/26/2003	11/26/2003	8449	TKL		
Barium	ND	1.00	mg/L	1						
Cadmium	ND	0.0500	mg/L	1						
Chromium	ND	0.100	mg/L	1						
Lead	ND	0.200	mg/L	1						
Selenium	ND	0.500	mg/L	1						
Silver	ND	0.200	mg/L	1						
ICP METALS-RCRA, TOTAL			SW6010B							
Arsenic	ND	5.00	mg/Kg	1	11/21/2003	11/21/2003	8413	TKL		
Cadmium	ND	2.00	mg/Kg	1						
Chromium	*16.8*	5.00	mg/Kg	1						
Lead	ND	20.0	mg/Kg	1						
MERCURY, TCLP LEACHED			SW1311/7470							
Mercury	ND	0.00250	mg/L	1	11/25/2003	11/25/2003	8440	SYL		
PAH BY EPA 8270 SIM			SW8270C							
Acenaphthene	ND	0.00667	mg/Kg	1	11/17/2003	11/26/2003	8367	SLK		
Benzo(a)pyrene	ND	0.00667	mg/Kg	1						
Fluoranthene	ND	0.00667	mg/Kg	1						
Naphthalene	ND	0.00667	mg/Kg	1						
Surr: 2-Fluorobiphenyl	47.1	30-115	%REC	1						
Surr: 4-Terphenyl-d14	52.0	18-137	%REC	1						
Surr: Nitrobenzene-d5	43.6	23-120	%REC	1						
PCBS IN SOIL OR SOLID WASTE			SW8082							
Aroclor 1016	ND	0.0331	mg/Kg	1	11/21/2003	11/21/2003	8408	SLK		
Aroclor 1221	ND	0.0662	mg/Kg	1						
Aroclor 1232	ND	0.0331	mg/Kg	1						
Aroclor 1242	ND	0.0331	mg/Kg	1						
Aroclor 1248	ND	0.0331	mg/Kg	1						
Aroclor 1254	ND	0.0331	mg/Kg	1						
Aroclor 1260	ND	0.0331	mg/Kg	1						
Surr: Decachlorobiphenyl	113	24-154	%REC	1						

Qualifiers:

- ND - Not Detected at the Reporting Limit
- J - Analyte detected below quantitation limits
- B - Analyte detected in the associated Method Blank
- * - Value exceeds Maximum Contaminant Level
- S - Spike Recovery outside accepted recovery limits
- R - RPD outside accepted recovery limits
- E - Value above quantitation range

Oceanic Analytical Laboratory, Inc.

Date: *Dec 02, 2003*

C ent:	Edward K. Noda & Associates	Client Sample ID:	N5-3.0
Lab Order:	0311088	Tag Number:	
P oject:	Upgrade Electrical System, Phase 1, Hickam AFB	Collection Date:	11/11/2003 14:04
I o ID:	0311088-09A	Matrix:	SOIL

A alyses	Result	Reporting Limit	Units	Dilution Factor	Date Prepared	Date Analyzed	Batch ID	Analyst	Qual	Notes
T. H (FUEL FINGERPRINT)			**SW8015M**							
TPH (Diesel)	ND	5.00	mg/Kg	1	11/17/2003	11/19/2003	8368	MDH		
PH (Jet A)	ND	5.00	mg/Kg	1						
H (JP-4)	ND	5.00	mg/Kg	1						
TPH (JP-5)	ND	5.00	mg/Kg	1						
TPH (Kerosene)	ND	5.00	mg/Kg	1						
H (Motor Oil)	ND	20.0	mg/Kg	1						
PH (Paint Thinner)	ND	5.00	mg/Kg	1						
TPH (Unidentifed Hydrocarbons as esel)	ND	5.00	mg/Kg	1						
H (Unidentifed Hydrocarbons as otor Oil)	ND	20.0	mg/Kg	1						
Surr: Pentacosane	60.1	31-152	%REC	1						

Qualifiers:

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- S - Spike Recovery outside accepted recovery limits
- R - RPD outside accepted recovery limits
- E - Value above quantitation range

Oceanic Analytical Laboratory, Inc.

Date: *Dec 02, 2003*

Client:	Edward K. Noda & Associates	**Client Sample ID:**	N5-3.0
Lab Order:	0311088	**Tag Number:**	
Project:	Upgrade Electrical System, Phase 1, Hickam AFB	**Collection Date:**	11/11/2003 14:04
Lab ID:	0311088-09B	**Matrix:**	SOIL

Analyses	Result	Reporting Limit	Units	Dilution Factor	Date Prepared	Date Analyzed	Batch ID	Analyst	Qual	Notes
TPH GASOLINE W/BTEX			**SW5030/8015M/8021B**							
Benzene	ND	0.0100	mg/Kg	1	11/25/2003	11/25/2003	R22442	SJR		
Ethylbenzene	ND	0.0100	mg/Kg	1						
m,p-Xylene	ND	0.0200	mg/Kg	1						
o-Xylene	ND	0.0100	mg/Kg	1						
Toluene	ND	0.0100	mg/Kg	1						
TPH (Gasoline C6-C12)	ND	1.00	mg/Kg	1						
Surr: a,a,a-Trifluorotoluene	86.6	54-126	%REC	1						

Qualifiers:

ND - Not Detected at the Reporting Limit
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B - Analyte detected in the associated Method Blank
* - Value exceeds Maximum Contaminant Level
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range

Oceanic Analytical Laboratory, Inc.

Date: *Dec 02, 2003*

(ent:	Edward K. Noda & Associates	**Client Sample ID:**	N5-3.0
Lab Order:	0311088	**Tag Number:**	
P-oject:	Upgrade Electrical System, Phase 1, Hickam AFB	**Collection Date:**	11/11/2003 14:04
I b ID:	0311088-09B	**Matrix:**	SOIL

/ lyses	Result	Reporting Limit	Units	Dilution Factor	Date Prepared	Date Analyzed	Batch ID	Analyst	Qual	Notes
\ LATILES BY GC/MS			**SW8260B**							
1,1,1,2-Tetrachloroethane	ND	0.0100	mg/Kg	1	11/21/2003	11/21/2003	R22378	KAL		
1 1,1-Trichloroethane	ND	0.0100	mg/Kg	1						
1,2,2-Tetrachloroethane	ND	0.0100	mg/Kg	1						
., 1,2-Trichloroethane	ND	0.0100	mg/Kg	1						
1,1-Dichloroethane	ND	0.0500	mg/Kg	1						
l-Dichloroethene	ND	0.0100	mg/Kg	1						
-Dichloropropene	ND	0.0100	mg/Kg	1						
1,2,3-Trichlorobenzene	ND	0.0100	mg/Kg	1						
1 ?,3-Trichloropropane	ND	0.0100	mg/Kg	1						
:,4-Trichlorobenzene	ND	0.0500	mg/Kg	1						
ı,2,4-Trimethylbenzene	ND	0.0100	mg/Kg	1						
1,2-Dibromo-3-chloropropane	ND	0.0100	mg/Kg	1						
-Dibromoethane	ND	0.0100	mg/Kg	1						
-Dichlorobenzene	ND	0.0500	mg/Kg	1						
1,2-Dichloroethane	ND	0.0100	mg/Kg	1						
-Dichloropropane	ND	0.0100	mg/Kg	1						
,5-Trimethylbenzene	ND	0.0100	mg/Kg	1						
1,3-Dichlorobenzene	ND	0.0500	mg/Kg	1						
1,3-Dichloropropane	ND	0.0100	mg/Kg	1						
-Dichlorobenzene	ND	0.0500	mg/Kg	1						
2,-Dichloropropane	ND	0.0100	mg/Kg	1						
2-Butanone	ND	0.0500	mg/Kg	1						
2 hlorotoluene	ND	0.0100	mg/Kg	1						
2 lexanone	ND	0.0500	mg/Kg	1						
4-Chlorotoluene	ND	0.0100	mg/Kg	1						
4-Isopropyltoluene	ND	0.0100	mg/Kg	1						
4 lethyl-2-pentanone	ND	0.0500	mg/Kg	1						
Acetone	ND	0.0500	mg/Kg	1						
Acrylonitrile	ND	0.0500	mg/Kg	1						
E nzene	ND	0.0100	mg/Kg	1						
E mobenzene	ND	0.0100	mg/Kg	1						
Bromochloromethane	ND	0.0500	mg/Kg	1						
E modichloromethane	ND	0.0100	mg/Kg	1						
E moform	ND	0.0100	mg/Kg	1						
Bromomethane	ND	0.100	mg/Kg	1						
Carbon disulfide	ND	0.0100	mg/Kg	1						
C bon tetrachloride	ND	0.0100	mg/Kg	1						
Chlorobenzene	ND	0.0100	mg/Kg	1						
Chloroethane	ND	0.0500	mg/Kg	1						
C oroform	ND	0.0100	mg/Kg	1						

Qualifiers:

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
* - Value exceeds Maximum Contaminant Level
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range

Oceanic Analytical Laboratory, Inc.

Date: *Dec 02, 2003*

Client:	Edward K. Noda & Associates	Client Sample ID:	N5-3.0
Lab Order:	0311088	Tag Number:	
Project:	Upgrade Electrical System, Phase 1, Hickam AFB	Collection Date:	11/11/2003 14:04
ab ID:	0311088-09B	Matrix:	SOIL

Analyses	Result	Reporting Limit	Units	Dilution Factor	Date Prepared	Date Analyzed	Batch ID	Analyst	Qual	Notes
Chloromethane	ND	0.0500	mg/Kg	1						
cis-1,2-Dichloroethene	ND	0.0100	mg/Kg	1						
cis-1,3-Dichloropropene	ND	0.0100	mg/Kg	1						
Dibromochloromethane	ND	0.0100	mg/Kg	1						
Dibromomethane	ND	0.0100	mg/Kg	1						
Dichlorodifluoromethane	ND	0.0500	mg/Kg	1						
Ethylbenzene	ND	0.0100	mg/Kg	1						
Hexachlorobutadiene	ND	0.0500	mg/Kg	1						
Iodomethane	ND	0.0500	mg/Kg	1						
Isopropylbenzene	ND	0.0100	mg/Kg	1						
m,p-Xylene	ND	0.0100	mg/Kg	1						
Methyl tert-butyl ether	ND	0.00500	mg/Kg	1						
Methylene chloride	ND	0.0500	mg/Kg	1						
-Butylbenzene	ND	0.0100	mg/Kg	1						
-Propylbenzene	ND	0.0100	mg/Kg	1						
Naphthalene	ND	0.0500	mg/Kg	1						
o-Xylene	ND	0.0100	mg/Kg	1						
sec-Butylbenzene	ND	0.0100	mg/Kg	1						
Styrene	ND	0.0100	mg/Kg	1						
tert-Butylbenzene	ND	0.0100	mg/Kg	1						
etrachloroethene	ND	0.0100	mg/Kg	1						
oluene	ND	0.0100	mg/Kg	1						
trans-1,2-Dichloroethene	ND	0.0100	mg/Kg	1						
ans-1,3-Dichloropropene	ND	0.0100	mg/Kg	1						
ans-1,4-Dichloro-2-butene	ND	0.0500	mg/Kg	1						
Trichloroethene	ND	0.0100	mg/Kg	1						
Trichlorofluoromethane	ND	0.0100	mg/Kg	1						
inyl acetate	ND	0.0500	mg/Kg	1						
Vinyl chloride	ND	0.0500	mg/Kg	1						
Surr: 1,2-Dichloroethane-d4	138	58-180	%REC	1						
Surr: 4-Bromofluorobenzene	168	69-173	%REC	1						
Surr: Dibromofluoromethane	119	71-142	%REC	1						
Surr: Toluene-d8	129	87-126	%REC	1					S	S04

Qualifiers:	ND - Not Detected at the Reporting Limit	S - Spike Recovery outside accepted recovery limits
	J - Analyte detected below quantitation limits	R - RPD outside accepted recovery limits
	B - Analyte detected in the associated Method Blank	E - Value above quantitation range
	* - Value exceeds Maximum Contaminant Level	

Oceanic Analytical Laboratory, Inc.

Date: *Dec 02, 2003*

Client:	Edward K. Noda & Associates	**Client Sample ID:**	N5-6.0
Lab Order:	0311088	**Tag Number:**	
Project:	Upgrade Electrical System, Phase 1, Hickam AFB	**Collection Date:**	11/11/2003 14:12
Lab ID:	0311088-10A	**Matrix:**	SOIL

Analyses	Result	Reporting Limit	Units	Dilution Factor	Date Prepared	Date Analyzed	Batch ID	Analyst	Qual	Notes
ICP METALS, TCLP LEACHED			SW1311/6010B							
Arsenic	ND	0.500	mg/L	1	11/26/2003	11/26/2003	8449	TKL		
Barium	ND	1.00	mg/L	1						
Cadmium	ND	0.0500	mg/L	1						
Chromium	ND	0.100	mg/L	1						
Lead	ND	0.200	mg/L	1						
Selenium	ND	0.500	mg/L	1						
Silver	ND	0.200	mg/L	1						
ICP METALS-RCRA, TOTAL			SW6010B							
Arsenic	*5.55*	5.00	mg/Kg	1	11/21/2003	11/21/2003	8413	TKL		
Cadmium	ND	2.00	mg/Kg	1						
Chromium	*21.5*	5.00	mg/Kg	1						
Lead	ND	20.0	mg/Kg	1						
MERCURY, TCLP LEACHED			SW1311/7470							
Mercury	ND	0.00250	mg/L	1	11/25/2003	11/25/2003	8440	SYL		
PAH BY EPA 8270 SIM			SW8270C							
Acenaphthene	ND	0.00667	mg/Kg	1	11/17/2003	11/26/2003	8367	SLK		
Benzo(a)pyrene	ND	0.00667	mg/Kg	1						
Fluoranthene	ND	0.00667	mg/Kg	1						
Naphthalene	ND	0.00667	mg/Kg	1						
Surr: 2-Fluorobiphenyl	45.5	30-115	%REC	1						
Surr: 4-Terphenyl-d14	57.8	18-137	%REC	1						
Surr: Nitrobenzene-d5	43.0	23-120	%REC	1						
PCBS IN SOIL OR SOLID WASTE			SW8082							
Aroclor 1016	ND	0.0333	mg/Kg	1	11/21/2003	11/21/2003	8408	SLK		
Aroclor 1221	ND	0.0667	mg/Kg	1						
Aroclor 1232	ND	0.0333	mg/Kg	1						
Aroclor 1242	ND	0.0333	mg/Kg	1						
Aroclor 1248	ND	0.0333	mg/Kg	1						
Aroclor 1254	ND	0.0333	mg/Kg	1						
Aroclor 1260	ND	0.0333	mg/Kg	1						
Surr: Decachlorobiphenyl	108	24-154	%REC	1						

Qualifiers:

- ND - Not Detected at the Reporting Limit
- J - Analyte detected below quantitation limits
- B - Analyte detected in the associated Method Blank
- * - Value exceeds Maximum Contaminant Level
- S - Spike Recovery outside accepted recovery limits
- R - RPD outside accepted recovery limits
- E - Value above quantitation range

Oceanic Analytical Laboratory, Inc.

Date: *Dec 02, 2003*

C ent:	Edward K. Noda & Associates	**Client Sample ID:**	N5-6.0
Lab Order:	0311088	**Tag Number:**	
P ject:	Upgrade Electrical System, Phase 1, Hickam AFB	**Collection Date:**	11/11/2003 14:12
L ID:	0311088-10A	**Matrix:**	SOIL

A lyses	Result	Reporting Limit	Units	Dilution Factor	Date Prepared	Date Analyzed	Batch ID	Analyst	Qual	Notes
T H (FUEL FINGERPRINT)			**SW8015M**							
TPH (Diesel)	ND	5.00	mg/Kg	1	11/17/2003	11/19/2003	8368	MDH		
TPH (Jet A)	ND	5.00	mg/Kg	1						
H (JP-4)	ND	5.00	mg/Kg	1						
TPH (JP-5)	ND	5.00	mg/Kg	1						
TPH (Kerosene)	ND	5.00	mg/Kg	1						
H (Motor Oil)	ND	20.0	mg/Kg	1						
H (Paint Thinner)	ND	5.00	mg/Kg	1						
TPH (Unidentifed Hydrocarbons as Diesel)	ND	5.00	mg/Kg	1						
H (Unidentifed Hydrocarbons as otor Oil)	ND	20.0	mg/Kg	1						
Surr: Pentacosane	67.8	31-152	%REC	1						

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

* - Value exceeds Maximum Contaminant Level

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

Oceanic Analytical Laboratory, Inc.

Date: *Dec 02, 2003*

Client:	Edward K. Noda & Associates	**Client Sample ID:**	N5-6.0
Lab Order:	0311088	**Tag Number:**	
Project:	Upgrade Electrical System, Phase 1, Hickam AFB	**Collection Date:**	11/11/2003 14:12
Lab ID:	0311088-10B	**Matrix:**	SOIL

Analyses	Result	Reporting Limit	Units	Dilution Factor	Date Prepared	Date Analyzed	Batch ID	Analyst	Qual	Notes
TPH GASOLINE W/BTEX			**SW5030/8015M/8021B**							
Benzene	ND	0.0100	mg/Kg	1	11/25/2003	11/25/2003	R22442	SJR		
Ethylbenzene	ND	0.0100	mg/Kg	1						
m,p-Xylene	ND	0.0200	mg/Kg	1						
o-Xylene	ND	0.0100	mg/Kg	1						
Toluene	ND	0.0100	mg/Kg	1						
TPH (Gasoline C6-C12)	ND	1.00	mg/Kg	1						
Surr: a,a,a-Trifluorotoluene	90.4	54-126	%REC	1						

Qualifiers:

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
* - Value exceeds Maximum Contaminant Level
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range

Oceanic Analytical Laboratory, Inc.

Date: *Dec 02, 2003*

C :nt:	Edward K. Noda & Associates	**Client Sample ID:**	N5-6.0
Lab Order:	0311088	**Tag Number:**	
P ject:	Upgrade Electrical System, Phase 1, Hickam AFB	**Collection Date:**	11/11/2003 14:12
L ID:	0311088-10B	**Matrix:**	SOIL

A lyses	Result	Reporting Limit	Units	Dilution Factor	Date Prepared	Date Analyzed	Batch ID	Analyst	Qual	Notes
V -ATILES BY GC/MS			SW8260B							
1,1,1,2-Tetrachloroethane	ND	0.0100	mg/Kg	1	11/21/2003	11/21/2003	R22378	KAL		
,1-Trichloroethane	ND	0.0100	mg/Kg	1						
,2,2-Tetrachloroethane	ND	0.0100	mg/Kg	1						
1,1,2-Trichloroethane	ND	0.0100	mg/Kg	1						
1,1-Dichloroethane	ND	0.0500	mg/Kg	1						
-Dichloroethene	ND	0.0100	mg/Kg	1						
-Dichloropropene	ND	0.0100	mg/Kg	1						
1,2,3-Trichlorobenzene	ND	0.0100	mg/Kg	1						
,3-Trichloropropane	ND	0.0100	mg/Kg	1						
,4-Trichlorobenzene	ND	0.0500	mg/Kg	1						
1,2,4-Trimethylbenzene	ND	0.0100	mg/Kg	1						
1 2-Dibromo-3-chloropropane	ND	0.0100	mg/Kg	1						
-Dibromoethane	ND	0.0100	mg/Kg	1						
,2-Dichlorobenzene	ND	0.0500	mg/Kg	1						
1,2-Dichloroethane	ND	0.0100	mg/Kg	1						
-Dichloropropane	ND	0.0100	mg/Kg	1						
,5-Trimethylbenzene	ND	0.0100	mg/Kg	1						
1,3-Dichlorobenzene	ND	0.0500	mg/Kg	1						
3-Dichloropropane	ND	0.0100	mg/Kg	1						
-Dichlorobenzene	ND	0.0500	mg/Kg	1						
2,2-Dichloropropane	ND	0.0100	mg/Kg	1						
2-Butanone	ND	0.0500	mg/Kg	1						
Chlorotoluene	ND	0.0100	mg/Kg	1						
lexanone	ND	0.0500	mg/Kg	1						
4-Chlorotoluene	ND	0.0100	mg/Kg	1						
sopropyltoluene	ND	0.0100	mg/Kg	1						
Methyl-2-pentanone	ND	0.0500	mg/Kg	1						
Acetone	ND	0.0500	mg/Kg	1						
Acrylonitrile	ND	0.0500	mg/Kg	1						
nzene	ND	0.0100	mg/Kg	1						
omobenzene	ND	0.0100	mg/Kg	1						
Bromochloromethane	ND	0.0500	mg/Kg	1						
omodichloromethane	ND	0.0100	mg/Kg	1						
omoform	ND	0.0100	mg/Kg	1						
Bromomethane	ND	0.100	mg/Kg	1						
rbon disulfide	ND	0.0100	mg/Kg	1						
rbon tetrachloride	ND	0.0100	mg/Kg	1						
Chlorobenzene	ND	0.0100	mg/Kg	1						
Chloroethane	ND	0.0500	mg/Kg	1						
loroform	ND	0.0100	mg/Kg	1						

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
* - Value exceeds Maximum Contaminant Level
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range

Oceanic Analytical Laboratory, Inc.

Date: *Dec 02, 2003*

Client:	Edward K. Noda & Associates	**Client Sample ID:**	N5-6.0
Lab Order:	0311088	**Tag Number:**	
Project:	Upgrade Electrical System, Phase 1, Hickam AFB	**Collection Date:**	11/11/2003 14:12
Lab ID:	0311088-10B	**Matrix:**	SOIL

Analyses	Result	Reporting Limit	Units	Dilution Factor	Date Prepared	Date Analyzed	Batch ID	Analyst	Qual	Notes
Chloromethane	ND	0.0500	mg/Kg	1						
cis-1,2-Dichloroethene	ND	0.0100	mg/Kg	1						
cis-1,3-Dichloropropene	ND	0.0100	mg/Kg	1						
Dibromochloromethane	ND	0.0100	mg/Kg	1						
Dibromomethane	ND	0.0100	mg/Kg	1						
Dichlorodifluoromethane	ND	0.0500	mg/Kg	1						
Ethylbenzene	ND	0.0100	mg/Kg	1						
Hexachlorobutadiene	ND	0.0500	mg/Kg	1						
Iodomethane	ND	0.0500	mg/Kg	1						
Isopropylbenzene	ND	0.0100	mg/Kg	1						
m,p-Xylene	ND	0.0100	mg/Kg	1						
Methyl tert-butyl ether	ND	0.00500	mg/Kg	1						
Methylene chloride	ND	0.0500	mg/Kg	1						
n-Butylbenzene	ND	0.0100	mg/Kg	1						
n-Propylbenzene	ND	0.0100	mg/Kg	1						
Naphthalene	ND	0.0500	mg/Kg	1						
o-Xylene	ND	0.0100	mg/Kg	1						
sec-Butylbenzene	ND	0.0100	mg/Kg	1						
Styrene	ND	0.0100	mg/Kg	1						
tert-Butylbenzene	ND	0.0100	mg/Kg	1						
Tetrachloroethene	ND	0.0100	mg/Kg	1						
Toluene	ND	0.0100	mg/Kg	1						
trans-1,2-Dichloroethene	ND	0.0100	mg/Kg	1						
trans-1,3-Dichloropropene	ND	0.0100	mg/Kg	1						
trans-1,4-Dichloro-2-butene	ND	0.0500	mg/Kg	1						
Trichloroethene	ND	0.0100	mg/Kg	1						
Trichlorofluoromethane	ND	0.0100	mg/Kg	1						
Vinyl acetate	ND	0.0500	mg/Kg	1						
Vinyl chloride	ND	0.0500	mg/Kg	1						
Surr: 1,2-Dichloroethane-d4	119	58-180	%REC	1						
Surr: 4-Bromofluorobenzene	117	69-173	%REC	1						
Surr: Dibromofluoromethane	101	71-142	%REC	1						
Surr: Toluene-d8	110	87-126	%REC	1						

Qualifiers:

ND - Not Detected at the Reporting Limit
S - Spike Recovery outside accepted recovery limits
J - Analyte detected below quantitation limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank
E - Value above quantitation range
* - Value exceeds Maximum Contaminant Level

Oceanic Analytical Laboratory, Inc.

Date: *Dec 02, 2003*

C :nt:	Edward K. Noda & Associates	**Client Sample ID:**	N4-3.0
Lab Order:	0311088	**Tag Number:**	
P ject:	Upgrade Electrical System, Phase 1, Hickam AFB	**Collection Date:**	11/11/2003 15:03
L..ɔ ID:	0311088-11A	**Matrix:**	SOIL

A lyses	Result	Reporting Limit	Units	Dilution Factor	Date Prepared	Date Analyzed	Batch ID	Analyst	Qual	Notes
IC. METALS, TCLP LEACHED			**SW1311/6010B**							
Arsenic	ND	0.500	mg/L	1	11/26/2003	11/26/2003	8449	TKL		
ꞁ rium	ND	1.00	mg/L	1						
(dmium	ND	0.0500	mg/L	1						
Chromium	ND	0.100	mg/L	1						
l ead	ND	0.200	mg/L	1						
: lenium	ND	0.500	mg/L	1						
..ver	ND	0.200	mg/L	1						
ICP METALS-RCRA, TOTAL			**SW6010B**							
, senic	ND	5.00	mg/Kg	1	11/21/2003	11/21/2003	8413	TKL		
Cadmium	ND	2.00	mg/Kg	1						
Chromium	*10.7*	5.00	mg/Kg	1						
ad	ND	20.0	mg/Kg	1						
MERCURY, TCLP LEACHED			**SW1311/7470**							
Mercury	ND	0.00250	mg/L	1	11/25/2003	11/25/2003	8440	SYL		
F H BY EPA 8270 SIM			**SW8270C**							
Acenaphthene	ND	0.00667	mg/Kg	1	11/17/2003	11/26/2003	8367	SLK		
Benzo(a)pyrene	ND	0.00667	mg/Kg	1						
ɔoranthene	ND	0.00667	mg/Kg	1						
..aphthalene	ND	0.00667	mg/Kg	1						
Surr: 2-Fluorobiphenyl	45.5	30-115	%REC	1						
Surr: 4-Terphenyl-d14	53.9	18-137	%REC	1						
Surr: Nitrobenzene-d5	40.6	23-120	%REC	1						
PCBS IN SOIL OR SOLID WASTE			**SW8082**							
oclor 1016	ND	0.0333	mg/Kg	1	11/21/2003	11/22/2003	8408	SLK		
oclor 1221	ND	0.0667	mg/Kg	1						
Aroclor 1232	ND	0.0333	mg/Kg	1						
^roclor 1242	ND	0.0333	mg/Kg	1						
oclor 1248	ND	0.0333	mg/Kg	1						
Aroclor 1254	ND	0.0333	mg/Kg	1						
Aroclor 1260	ND	0.0333	mg/Kg	1						
Surr: Decachlorobiphenyl	101	24-154	%REC	1						

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
* - Value exceeds Maximum Contaminant Level
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range

Oceanic Analytical Laboratory, Inc.

Date: *Dec 02, 2003*

Client:	Edward K. Noda & Associates	**Client Sample ID:**	N4-3.0
Lab Order:	0311088	**Tag Number:**	
Project:	Upgrade Electrical System, Phase 1, Hickam AFB	**Collection Date:**	11/11/2003 15:03
Lab ID:	0311088-11A	**Matrix:**	SOIL

Analyses	Result	Reporting Limit	Units	Dilution Factor	Date Prepared	Date Analyzed	Batch ID	Analyst	Qual	Notes
TPH (FUEL FINGERPRINT)			**SW8015M**							
TPH (Diesel)	ND	5.00	mg/Kg	1	11/17/2003	11/19/2003	8368	MDH		
TPH (Jet A)	ND	5.00	mg/Kg	1						
TPH (JP-4)	ND	5.00	mg/Kg	1						
TPH (JP-5)	ND	5.00	mg/Kg	1						
TPH (Kerosene)	ND	5.00	mg/Kg	1						
TPH (Motor Oil)	ND	20.0	mg/Kg	1						
TPH (Paint Thinner)	ND	5.00	mg/Kg	1						
TPH (Unidentifed Hydrocarbons as Diesel)	ND	5.00	mg/Kg	1						
TPH (Unidentifed Hydrocarbons as Motor Oil)	ND	20.0	mg/Kg	1						
Surr: Pentacosane	76.2	31-152	%REC	1						

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

* - Value exceeds Maximum Contaminant Level

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

Oceanic Analytical Laboratory, Inc.

Date: *Dec 02, 2003*

(ient:	Edward K. Noda & Associates	**Client Sample ID:**	N4-3.0
Lab Order:	0311088	**Tag Number:**	
l oject:	Upgrade Electrical System, Phase 1, Hickam AFB	**Collection Date:**	11/11/2003 15:03
L..b ID:	0311088-11B	**Matrix:**	SOIL

alyses	Result	Reporting Limit	Units	Dilution Factor	Date Prepared	Date Analyzed	Batch ID	Analyst	Qual	Notes
ı rH GASOLINE W/BTEX			**SW5030/8015M/8021B**							
Benzene	ND	0.0100	mg/Kg	1	11/25/2003	11/25/2003	R22442	SJR		
:hylbenzene	ND	0.0100	mg/Kg	1						
,p-Xylene	ND	0.0200	mg/Kg	1						
o-Xylene	ND	0.0100	mg/Kg	1						
ᵀoluene	ND	0.0100	mg/Kg	1						
ᵓH (Gasoline C6-C12)	ND	1.00	mg/Kg	1						
Surr: a,a,a-Trifluorotoluene	87.2	54-126	%REC	1						

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

* - Value exceeds Maximum Contaminant Level

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

Oceanic Analytical Laboratory, Inc.

Date: *Dec 02, 2003*

Client:	Edward K. Noda & Associates	**Client Sample ID:**	N4-3.0
Lab Order:	0311088	**Tag Number:**	
Project:	Upgrade Electrical System, Phase 1, Hickam AFB	**Collection Date:**	11/11/2003 15:03
Lab ID:	0311088-11B	**Matrix:**	SOIL

Analyses	Result	Reporting Limit	Units	Dilution Factor	Date Prepared	Date Analyzed	Batch ID	Analyst	Qual	Notes
VOLATILES BY GC/MS			**SW8260B**							
1,1,1,2-Tetrachloroethane	ND	0.0100	mg/Kg	1	11/22/2003	11/22/2003	R22378	KAL		
1,1,1-Trichloroethane	ND	0.0100	mg/Kg	1						
1,1,2,2-Tetrachloroethane	ND	0.0100	mg/Kg	1						
1,1,2-Trichloroethane	ND	0.0100	mg/Kg	1						
1,1-Dichloroethane	ND	0.0500	mg/Kg	1						
1,1-Dichloroethene	ND	0.0100	mg/Kg	1						
1,1-Dichloropropene	ND	0.0100	mg/Kg	1						
1,2,3-Trichlorobenzene	ND	0.0100	mg/Kg	1						
1,2,3-Trichloropropane	ND	0.0100	mg/Kg	1						
1,2,4-Trichlorobenzene	ND	0.0500	mg/Kg	1						
1,2,4-Trimethylbenzene	ND	0.0100	mg/Kg	1						
1,2-Dibromo-3-chloropropane	ND	0.0100	mg/Kg	1						
1,2-Dibromoethane	ND	0.0100	mg/Kg	1						
1,2-Dichlorobenzene	ND	0.0500	mg/Kg	1						
1,2-Dichloroethane	ND	0.0100	mg/Kg	1						
1,2-Dichloropropane	ND	0.0100	mg/Kg	1						
1,3,5-Trimethylbenzene	ND	0.0100	mg/Kg	1						
1,3-Dichlorobenzene	ND	0.0500	mg/Kg	1						
1,3-Dichloropropane	ND	0.0100	mg/Kg	1						
1,4-Dichlorobenzene	ND	0.0500	mg/Kg	1						
2,2-Dichloropropane	ND	0.0100	mg/Kg	1						
2-Butanone	ND	0.0500	mg/Kg	1						
2-Chlorotoluene	ND	0.0100	mg/Kg	1						
2-Hexanone	ND	0.0500	mg/Kg	1						
4-Chlorotoluene	ND	0.0100	mg/Kg	1						
4-Isopropyltoluene	ND	0.0100	mg/Kg	1						
4-Methyl-2-pentanone	ND	0.0500	mg/Kg	1						
Acetone	ND	0.0500	mg/Kg	1						
Acrylonitrile	ND	0.0500	mg/Kg	1						
Benzene	ND	0.0100	mg/Kg	1						
Bromobenzene	ND	0.0100	mg/Kg	1						
Bromochloromethane	ND	0.0500	mg/Kg	1						
Bromodichloromethane	ND	0.0100	mg/Kg	1						
Bromoform	ND	0.0100	mg/Kg	1						
Bromomethane	ND	0.100	mg/Kg	1						
Carbon disulfide	ND	0.0100	mg/Kg	1						
Carbon tetrachloride	ND	0.0100	mg/Kg	1						
Chlorobenzene	ND	0.0100	mg/Kg	1						
Chloroethane	ND	0.0500	mg/Kg	1						
Chloroform	ND	0.0100	mg/Kg	1						

Qualifiers:
ND - Not Detected at the Reporting Limit
S - Spike Recovery outside accepted recovery limits
J - Analyte detected below quantitation limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank
E - Value above quantitation range
* - Value exceeds Maximum Contaminant Level

Oceanic Analytical Laboratory, Inc.

Date: *Dec 02, 2003*

C ent:	Edward K. Noda & Associates	**Client Sample ID:**	N4-3.0
Lab Order:	0311088	**Tag Number:**	
P)ject:	Upgrade Electrical System, Phase 1, Hickam AFB	**Collection Date:**	11/11/2003 15:03
L o ID:	0311088-11B	**Matrix:**	SOIL

A ilyses	Result	Reporting Limit	Units	Dilution Factor	Date Prepared	Date Analyzed	Batch ID	Analyst	Qual	Notes
.. loromethane	ND	0.0500	mg/Kg	1						
cis-1,2-Dichloroethene	ND	0.0100	mg/Kg	1						
;-1,3-Dichloropropene	ND	0.0100	mg/Kg	1						
bromochloromethane	ND	0.0100	mg/Kg	1						
Dibromomethane	ND	0.0100	mg/Kg	1						
Dichlorodifluoromethane	ND	0.0500	mg/Kg	1						
hylbenzene	ND	0.0100	mg/Kg	1						
,,exachlorobutadiene	ND	0.0500	mg/Kg	1						
Iodomethane	ND	0.0500	mg/Kg	1						
opropylbenzene	ND	0.0100	mg/Kg	1						
,p-Xylene	ND	0.0100	mg/Kg	1						
Methyl tert-butyl ether	ND	0.00500	mg/Kg	1						
Methylene chloride	ND	0.0500	mg/Kg	1						
Butylbenzene	ND	0.0100	mg/Kg	1						
n-Propylbenzene	ND	0.0100	mg/Kg	1						
Naphthalene	ND	0.0500	mg/Kg	1						
Xylene	ND	0.0100	mg/Kg	1						
;c-Butylbenzene	ND	0.0100	mg/Kg	1						
Styrene	ND	0.0100	mg/Kg	1						
rt-Butylbenzene	ND	0.0100	mg/Kg	1						
etrachloroethene	ND	0.0100	mg/Kg	1						
Toluene	ND	0.0100	mg/Kg	1						
trans-1,2-Dichloroethene	ND	0.0100	mg/Kg	1						
ans-1,3-Dichloropropene	ND	0.0100	mg/Kg	1						
ans-1,4-Dichloro-2-butene	ND	0.0500	mg/Kg	1						
Trichloroethene	ND	0.0100	mg/Kg	1						
richlorofluoromethane	ND	0.0100	mg/Kg	1						
inyl acetate	ND	0.0500	mg/Kg	1						
Vinyl chloride	ND	0.0500	mg/Kg	1						
Surr: 1,2-Dichloroethane-d4	114	58-180	%REC	1						
Surr: 4-Bromofluorobenzene	111	69-173	%REC	1						
Surr: Dibromofluoromethane	102	71-142	%REC	1						
Surr: Toluene-d8	94.3	87-126	%REC	1						

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

* - Value exceeds Maximum Contaminant Level

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

Oceanic Analytical Laboratory, Inc.

Date: *Dec 02, 2003*

Client:	Edward K. Noda & Associates	**Client Sample ID:**	N4-8.0
Lab Order:	0311088	**Tag Number:**	
Project:	Upgrade Electrical System, Phase 1, Hickam AFB	**Collection Date:**	11/11/2003 15:10
Lab ID:	0311088-12A	**Matrix:**	SOIL

Analyses	Result	Reporting Limit	Units	Dilution Factor	Date Prepared	Date Analyzed	Batch ID	Analyst	Qual	Notes
ICP METALS, TCLP LEACHED			**SW1311/6010B**							
Arsenic	ND	0.500	mg/L	1	11/26/2003	11/26/2003	8449	TKL		
Barium	ND	1.00	mg/L	1						
Cadmium	ND	0.0500	mg/L	1						
Chromium	ND	0.100	mg/L	1						
Lead	ND	0.200	mg/L	1						
Selenium	ND	0.500	mg/L	1						
Silver	ND	0.200	mg/L	1						
ICP METALS-RCRA, TOTAL			**SW6010B**							
Arsenic	ND	5.00	mg/Kg	1	11/21/2003	11/21/2003	8413	TKL		
Cadmium	ND	2.00	mg/Kg	1						
Chromium	*65.3*	5.00	mg/Kg	1						
Lead	ND	20.0	mg/Kg	1						
MERCURY, TCLP LEACHED			**SW1311/7470**							
Mercury	ND	0.00250	mg/L	1	11/25/2003	11/25/2003	8440	SYL		
PAH BY EPA 8270 SIM			**SW8270C**							
Acenaphthene	ND	0.00667	mg/Kg	1	11/17/2003	11/27/2003	8367	SLK		
Benzo(a)pyrene	ND	0.00667	mg/Kg	1						
Fluoranthene	ND	0.00667	mg/Kg	1						
Naphthalene	ND	0.00667	mg/Kg	1						
Surr: 2-Fluorobiphenyl	51.5	30-115	%REC	1						
Surr: 4-Terphenyl-d14	57.5	18-137	%REC	1						
Surr: Nitrobenzene-d5	49.9	23-120	%REC	1						
PCBS IN SOIL OR SOLID WASTE			**SW8082**							
Aroclor 1016	ND	0.0333	mg/Kg	1	11/21/2003	11/22/2003	8408	SLK		
Aroclor 1221	ND	0.0667	mg/Kg	1						
Aroclor 1232	ND	0.0333	mg/Kg	1						
Aroclor 1242	ND	0.0333	mg/Kg	1						
Aroclor 1248	ND	0.0333	mg/Kg	1						
Aroclor 1254	ND	0.0333	mg/Kg	1						
Aroclor 1260	ND	0.0333	mg/Kg	1						
Surr: Decachlorobiphenyl	122	24-154	%REC	1						

Qualifiers:

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
* - Value exceeds Maximum Contaminant Level
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range

Oceanic Analytical Laboratory, Inc.

Date: *Dec 02, 2003*

C :nt:	Edward K. Noda & Associates	**Client Sample ID:**	N4-8.0
Lab Order:	0311088	**Tag Number:**	
P: ⁻ject:	Upgrade Electrical System, Phase 1, Hickam AFB	**Collection Date:**	11/11/2003 15:10
L ID:	0311088-12A	**Matrix:**	SOIL

A lyses	Result	Reporting Limit	Units	Dilution Factor	Date Prepared	Date Analyzed	Batch ID	Analyst	Qual	Notes
TI I (FUEL FINGERPRINT)			**SW8015M**							
TPH (Diesel)	ND	5.00	mg/Kg	1	11/17/2003	11/19/2003	8368	MDH		
T^PH (Jet A)	ND	5.00	mg/Kg	1						
T H (JP-4)	ND	5.00	mg/Kg	1						
TrH (JP-5)	ND	5.00	mg/Kg	1						
TPH (Kerosene)	ND	5.00	mg/Kg	1						
T H (Motor Oil)	ND	20.0	mg/Kg	1						
T H (Paint Thinner)	ND	5.00	mg/Kg	1						
TPH (Unidentifed Hydrocarbons as Diesel)	ND	5.00	mg/Kg	1						
T H (Unidentifed Hydrocarbons as N :or Oil)	ND	20.0	mg/Kg	1						
Surr: Pentacosane	76.2	31-152	%REC	1						

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

* - Value exceeds Maximum Contaminant Level

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

Oceanic Analytical Laboratory, Inc.

Date: *Dec 02, 2003*

Client:	Edward K. Noda & Associates	**Client Sample ID:**	N4-8.0
Lab Order:	0311088	**Tag Number:**	
Project:	Upgrade Electrical System, Phase 1, Hickam AFB	**Collection Date:**	11/11/2003 15:10
Lab ID:	0311088-12B	**Matrix:**	SOIL

Analyses	Result	Reporting Limit	Units	Dilution Factor	Date Prepared	Date Analyzed	Batch ID	Analyst	Qual	Notes
TPH GASOLINE W/BTEX				**SW5030/8015M/8021B**						
Benzene	ND	0.0100	mg/Kg	1	11/25/2003	11/25/2003	R22442	SJR		
Ethylbenzene	***0.157***	0.0100	mg/Kg	1						
m,p-Xylene	ND	0.0200	mg/Kg	1						
o-Xylene	***0.0232***	0.0100	mg/Kg	1						
Toluene	ND	0.0100	mg/Kg	1						
TPH (Gasoline C6-C12)	***49.4***	1.00	mg/Kg	1						G08
Surr: a,a,a-Trifluorotoluene	266	54-126	%REC	1					S	S02

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

* - Value exceeds Maximum Contaminant Level

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

Oceanic Analytical Laboratory, Inc.

Date: *Dec 02, 2003*

ient:	Edward K. Noda & Associates	**Client Sample ID:**	N4-8.0
Lab Order:	0311088	**Tag Number:**	
P-oject:	Upgrade Electrical System, Phase 1, Hickam AFB	**Collection Date:**	11/11/2003 15:10
ıb ID:	0311088-12B	**Matrix:**	SOIL

ıalyses	Result	Reporting Limit	Units	Dilution Factor	Date Prepared	Date Analyzed	Batch ID	Analyst	Qual	Notes
)LATILES BY GC/MS			**SW8260B**							
1,1,1,2-Tetrachloroethane	ND	0.0100	mg/Kg	1	11/22/2003	11/22/2003	R22378	KAL		
1,1,1-Trichloroethane	ND	0.0100	mg/Kg	1						
,1,2,2-Tetrachloroethane	ND	0.0100	mg/Kg	1						
ı,1,2-Trichloroethane	ND	0.0100	mg/Kg	1						
1,1-Dichloroethane	ND	0.0500	mg/Kg	1						
,1-Dichloroethene	ND	0.0100	mg/Kg	1						
,1-Dichloropropene	ND	0.0100	mg/Kg	1						
1,2,3-Trichlorobenzene	ND	0.0100	mg/Kg	1						
,2,3-Trichloropropane	ND	0.0100	mg/Kg	1						
,2,4-Trichlorobenzene	ND	0.0500	mg/Kg	1						
1,2,4-Trimethylbenzene	ND	0.0100	mg/Kg	1						
1,2-Dibromo-3-chloropropane	ND	0.0100	mg/Kg	1						
,2-Dibromoethane	ND	0.0100	mg/Kg	1						
,2-Dichlorobenzene	ND	0.0500	mg/Kg	1						
1,2-Dichloroethane	ND	0.0100	mg/Kg	1						
,2-Dichloropropane	ND	0.0100	mg/Kg	1						
,3,5-Trimethylbenzene	ND	0.0100	mg/Kg	1						
1,3-Dichlorobenzene	ND	0.0500	mg/Kg	1						
1,3-Dichloropropane	ND	0.0100	mg/Kg	1						
,4-Dichlorobenzene	ND	0.0500	mg/Kg	1						
2,2-Dichloropropane	ND	0.0100	mg/Kg	1						
2-Butanone	ND	0.0500	mg/Kg	1						
-Chlorotoluene	ND	0.0100	mg/Kg	1						
-Hexanone	ND	0.0500	mg/Kg	1						
4-Chlorotoluene	ND	0.0100	mg/Kg	1						
-Isopropyltoluene	ND	0.0100	mg/Kg	1						
-Methyl-2-pentanone	ND	0.0500	mg/Kg	1						
Acetone	ND	0.0500	mg/Kg	1						
Acrylonitrile	ND	0.0500	mg/Kg	1						
3enzene	ND	0.0100	mg/Kg	1						
3romobenzene	ND	0.0100	mg/Kg	1						
Bromochloromethane	ND	0.0500	mg/Kg	1						
3romodichloromethane	ND	0.0100	mg/Kg	1						
3romoform	ND	0.0100	mg/Kg	1						
Bromomethane	ND	0.100	mg/Kg	1						
Carbon disulfide	ND	0.0100	mg/Kg	1						
Carbon tetrachloride	ND	0.0100	mg/Kg	1						
Chlorobenzene	ND	0.0100	mg/Kg	1						
Chloroethane	ND	0.0500	mg/Kg	1						
Chloroform	ND	0.0100	mg/Kg	1						

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

* - Value exceeds Maximum Contaminant Level

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

Oceanic Analytical Laboratory, Inc.

Date: *Dec 02, 2003*

Client:	Edward K. Noda & Associates	**Client Sample ID:**	N4-8.0
Lab Order:	0311088	**Tag Number:**	
Project:	Upgrade Electrical System, Phase 1, Hickam AFB	**Collection Date:**	11/11/2003 15:10
Lab ID:	0311088-12B	**Matrix:**	SOIL

Analyses	Result	Reporting Limit	Units	Dilution Factor	Date Prepared	Date Analyzed	Batch ID	Analyst	Qual	Notes
Chloromethane	ND	0.0500	mg/Kg	1						
cis-1,2-Dichloroethene	ND	0.0100	mg/Kg	1						
cis-1,3-Dichloropropene	ND	0.0100	mg/Kg	1						
Dibromochloromethane	ND	0.0100	mg/Kg	1						
Dibromomethane	ND	0.0100	mg/Kg	1						
Dichlorodifluoromethane	ND	0.0500	mg/Kg	1						
Ethylbenzene	ND	0.0100	mg/Kg	1						
Hexachlorobutadiene	ND	0.0500	mg/Kg	1						
Iodomethane	ND	0.0500	mg/Kg	1						
Isopropylbenzene	ND	0.0100	mg/Kg	1						
m,p-Xylene	ND	0.0100	mg/Kg	1						
Methyl tert-butyl ether	ND	0.00500	mg/Kg	1						
Methylene chloride	ND	0.0500	mg/Kg	1						
n-Butylbenzene	ND	0.0100	mg/Kg	1						
n-Propylbenzene	ND	0.0100	mg/Kg	1						
Naphthalene	ND	0.0500	mg/Kg	1						
o-Xylene	ND	0.0100	mg/Kg	1						
sec-Butylbenzene	ND	0.0100	mg/Kg	1						
Styrene	ND	0.0100	mg/Kg	1						
tert-Butylbenzene	ND	0.0100	mg/Kg	1						
Tetrachloroethene	ND	0.0100	mg/Kg	1						
Toluene	ND	0.0100	mg/Kg	1						
trans-1,2-Dichloroethene	ND	0.0100	mg/Kg	1						
trans-1,3-Dichloropropene	ND	0.0100	mg/Kg	1						
trans-1,4-Dichloro-2-butene	ND	0.0500	mg/Kg	1						
Trichloroethene	ND	0.0100	mg/Kg	1						
Trichlorofluoromethane	ND	0.0100	mg/Kg	1						
Vinyl acetate	ND	0.0500	mg/Kg	1						
Vinyl chloride	ND	0.0500	mg/Kg	1						
Surr: 1,2-Dichloroethane-d4	99.3	58-180	%REC	1						
Surr: 4-Bromofluorobenzene	78.0	69-173	%REC	1						
Surr: Dibromofluoromethane	88.0	71-142	%REC	1						
Surr: Toluene-d8	83.5	87-126	%REC	1					S	S04

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

* - Value exceeds Maximum Contaminant Level

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

Oceanic Analytical Laboratory, Inc.

Date: *Dec 02, 2003*

ient:	Edward K. Noda & Associates	**Client Sample ID:**	N3-3.0
Lab Order:	0311088	**Tag Number:**	
ojcct:	Upgrade Electrical System, Phase 1, Hickam AFB	**Collection Date:**	11/11/2003 15:45
ıb ID:	0311088-13A	**Matrix:**	SOIL

ıalyses	Result	Reporting Limit	Units	Dilution Factor	Date Prepared	Date Analyzed	Batch ID	Analyst	Qual	Notes
P METALS, TCLP LEACHED			SW1311/6010B							
Arsenic	ND	0.500	mg/L	1	11/26/2003	11/26/2003	8449	TKL		
ˀarium	ND	1.00	mg/L	1						
;admium	ND	0.0500	mg/L	1						
Chromium	ND	0.100	mg/L	1						
Lead	ND	0.200	mg/L	1						
ielenium	ND	0.500	mg/L	1						
ilver	ND	0.200	mg/L	1						
ICP METALS-RCRA, TOTAL			SW6010B							
ırsenic	ND	5.00	mg/Kg	1	11/21/2003	11/21/2003	8413	TKL		
;admium	ND	2.00	mg/Kg	1						
Chromium	12.5	5.00	mg/Kg	1						
.ead	ND	20.0	mg/Kg	1						
ıvıERCURY, TCLP LEACHED			SW1311/7470							
Mercury	ND	0.00250	mg/L	1	11/25/2003	11/25/2003	8440	SYL		
AH BY EPA 8270 SIM			SW8270C							
Acenaphthene	ND	0.00667	mg/Kg	1	11/17/2003	11/27/2003	8367	SLK		
Benzo(a)pyrene	ND	0.00667	mg/Kg	1						
·luoranthene	ND	0.00667	mg/Kg	1						
ɬaphthalene	ND	0.00667	mg/Kg	1						
Surr: 2-Fluorobiphenyl	54.5	30-115	%REC	1						
Surr: 4-Terphenyl-d14	56.7	18-137	%REC	1						
Surr: Nitrobenzene-d5	51.6	23-120	%REC	1						
PCBS IN SOIL OR SOLID WASTE			SW8082							
Aroclor 1016	ND	0.0331	mg/Kg	1	11/21/2003	11/22/2003	8408	SLK		
Aroclor 1221	ND	0.0662	mg/Kg	1						
Aroclor 1232	ND	0.0331	mg/Kg	1						
Aroclor 1242	ND	0.0331	mg/Kg	1						
Aroclor 1248	ND	0.0331	mg/Kg	1						
Aroclor 1254	ND	0.0331	mg/Kg	1						
Aroclor 1260	ND	0.0331	mg/Kg	1						
Surr: Decachlorobiphenyl	120	24-154	%REC	1						

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

* - Value exceeds Maximum Contaminant Level

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

Oceanic Analytical Laboratory, Inc.

Date: *Dec 02, 2003*

Client:	Edward K. Noda & Associates	**Client Sample ID:**	N3-3.0
Lab Order:	0311088	**Tag Number:**	
Project:	Upgrade Electrical System, Phase 1, Hickam AFB	**Collection Date:**	11/11/2003 15:45
Lab ID:	0311088-13A	**Matrix:**	SOIL

Analyses	Result	Reporting Limit	Units	Dilution Factor	Date Prepared	Date Analyzed	Batch ID	Analyst	Qual	Notes
TPH (FUEL FINGERPRINT)			**SW8015M**							
TPH (Diesel)	ND	5.00	mg/Kg	1	11/17/2003	11/19/2003	8368	MDH		
TPH (Jet A)	ND	5.00	mg/Kg	1						
TPH (JP-4)	ND	5.00	mg/Kg	1						
TPH (JP-5)	ND	5.00	mg/Kg	1						
TPH (Kerosene)	ND	5.00	mg/Kg	1						
TPH (Motor Oil)	ND	20.0	mg/Kg	1						
TPH (Paint Thinner)	ND	5.00	mg/Kg	1						
TPH (Unidentifed Hydrocarbons as Diesel)	ND	5.00	mg/Kg	1						
TPH (Unidentifed Hydrocarbons as Motor Oil)	ND	20.0	mg/Kg	1						
Surr: Pentacosane	74.7	31-152	%REC	1						

Qualifiers:

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J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
* - Value exceeds Maximum Contaminant Level
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range

Oceanic Analytical Laboratory, Inc.

Date: *Dec 02, 2003*

(ent:	Edward K. Noda & Associates	**Client Sample ID:**	N3-3.0
Lab Order:	0311088	**Tag Number:**	
I ɔject:	Upgrade Electrical System, Phase 1, Hickam AFB	**Collection Date:**	11/11/2003 15:45
I b ID:	0311088-13B	**Matrix:**	SOIL

⁄ alyses	Result	Reporting Limit	Units	Dilution Factor	Date Prepared	Date Analyzed	Batch ID	Analyst	Qual	Notes
⁊. H GASOLINE W/BTEX			SW5030/8015M/8021B							
Benzene	ND	0.0100	mg/Kg	1	11/25/2003	11/25/2003	R22442	SJR		
‾ hylbenzene	ND	0.0100	mg/Kg	1						
,p-Xylene	ND	0.0200	mg/Kg	1						
o-Xylene	ND	0.0100	mg/Kg	1						
Toluene	ND	0.0100	mg/Kg	1						
ᵓH (Gasoline C6-C12)	ND	1.00	mg/Kg	1						
Surr: a,a,a-Trifluorotoluene	84.1	54-126	%REC	1						

Qualifiers:

- ND - Not Detected at the Reporting Limit
- J - Analyte detected below quantitation limits
- B - Analyte detected in the associated Method Blank
- * - Value exceeds Maximum Contaminant Level
- S - Spike Recovery outside accepted recovery limits
- R - RPD outside accepted recovery limits
- E - Value above quantitation range

Oceanic Analytical Laboratory, Inc.

Date: *Dec 02, 2003*

Client:	Edward K. Noda & Associates	**Client Sample ID:**	N3-3.0
Lab Order:	0311088	**Tag Number:**	
Project:	Upgrade Electrical System, Phase 1, Hickam AFB	**Collection Date:**	11/11/2003 15:45
Lab ID:	0311088-13B	**Matrix:**	SOIL

Analyses	Result	Reporting Limit	Units	Dilution Factor	Date Prepared	Date Analyzed	Batch ID	Analyst	Qual	Notes
VOLATILES BY GC/MS			**SW8260B**							
1,1,1,2-Tetrachloroethane	ND	0.0100	mg/Kg	1	11/22/2003	11/22/2003	R22378	KAL		
1,1,1-Trichloroethane	ND	0.0100	mg/Kg	1						
1,1,2,2-Tetrachloroethane	ND	0.0100	mg/Kg	1						
1,1,2-Trichloroethane	ND	0.0100	mg/Kg	1						
1,1-Dichloroethane	ND	0.0500	mg/Kg	1						
1,1-Dichloroethene	ND	0.0100	mg/Kg	1						
1,1-Dichloropropene	ND	0.0100	mg/Kg	1						
1,2,3-Trichlorobenzene	ND	0.0100	mg/Kg	1						
1,2,3-Trichloropropane	ND	0.0100	mg/Kg	1						
1,2,4-Trichlorobenzene	ND	0.0500	mg/Kg	1						
1,2,4-Trimethylbenzene	ND	0.0100	mg/Kg	1						
1,2-Dibromo-3-chloropropane	ND	0.0100	mg/Kg	1						
1,2-Dibromoethane	ND	0.0100	mg/Kg	1						
1,2-Dichlorobenzene	ND	0.0500	mg/Kg	1						
1,2-Dichloroethane	ND	0.0100	mg/Kg	1						
1,2-Dichloropropane	ND	0.0100	mg/Kg	1						
1,3,5-Trimethylbenzene	ND	0.0100	mg/Kg	1						
1,3-Dichlorobenzene	ND	0.0500	mg/Kg	1						
1,3-Dichloropropane	ND	0.0100	mg/Kg	1						
1,4-Dichlorobenzene	ND	0.0500	mg/Kg	1						
2,2-Dichloropropane	ND	0.0100	mg/Kg	1						
2-Butanone	ND	0.0500	mg/Kg	1						
2-Chlorotoluene	ND	0.0100	mg/Kg	1						
2-Hexanone	ND	0.0500	mg/Kg	1						
4-Chlorotoluene	ND	0.0100	mg/Kg	1						
4-Isopropyltoluene	ND	0.0100	mg/Kg	1						
4-Methyl-2-pentanone	ND	0.0500	mg/Kg	1						
Acetone	ND	0.0500	mg/Kg	1						
Acrylonitrile	ND	0.0500	mg/Kg	1						
Benzene	ND	0.0100	mg/Kg	1						
Bromobenzene	ND	0.0100	mg/Kg	1						
Bromochloromethane	ND	0.0500	mg/Kg	1						
Bromodichloromethane	ND	0.0100	mg/Kg	1						
Bromoform	ND	0.0100	mg/Kg	1						
Bromomethane	ND	0.100	mg/Kg	1						
Carbon disulfide	ND	0.0100	mg/Kg	1						
Carbon tetrachloride	ND	0.0100	mg/Kg	1						
Chlorobenzene	ND	0.0100	mg/Kg	1						
Chloroethane	ND	0.0500	mg/Kg	1						
Chloroform	ND	0.0100	mg/Kg	1						

Qualifiers:

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J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
* - Value exceeds Maximum Contaminant Level
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
E - Value above quantitation range

Oceanic Analytical Laboratory, Inc.

Date: *Dec 02, 2003*

ient:	Edward K. Noda & Associates	Client Sample ID:	N3-3.0
Lab Order:	0311088	Tag Number:	
⁻ 'oject:	Upgrade Electrical System, Phase 1, Hickam AFB	Collection Date:	11/11/2003 15:45
ıb ID:	0311088-13B	Matrix:	SOIL

ıalyses	Result	Reporting Limit	Units	Dilution Factor	Date Prepared	Date Analyzed	Batch ID	Analyst	Qual	Notes
hloromethane	ND	0.0500	mg/Kg	1						
cis-1,2-Dichloroethene	ND	0.0100	mg/Kg	1						
·ls-1,3-Dichloropropene	ND	0.0100	mg/Kg	1						
ibromochloromethane	ND	0.0100	mg/Kg	1						
Dibromomethane	ND	0.0100	mg/Kg	1						
Dichlorodifluoromethane	ND	0.0500	mg/Kg	1						
thylbenzene	ND	0.0100	mg/Kg	1						
exachlorobutadiene	ND	0.0500	mg/Kg	1						
Iodomethane	ND	0.0500	mg/Kg	1						
;opropylbenzene	ND	0.0100	mg/Kg	1						
ı,p-Xylene	ND	0.0100	mg/Kg	1						
Methyl tert-butyl ether	ND	0.00500	mg/Kg	1						
Methylene chloride	ND	0.0500	mg/Kg	1						
-Butylbenzene	ND	0.0100	mg/Kg	1						
ı-Propylbenzene	ND	0.0100	mg/Kg	1						
Naphthalene	ND	0.0500	mg/Kg	1						
-Xylene	ND	0.0100	mg/Kg	1						
ec-Butylbenzene	ND	0.0100	mg/Kg	1						
Styrene	ND	0.0100	mg/Kg	1						
·ert-Butylbenzene	ND	0.0100	mg/Kg	1						
etrachloroethene	ND	0.0100	mg/Kg	1						
Toluene	ND	0.0100	mg/Kg	1						
trans-1,2-Dichloroethene	ND	0.0100	mg/Kg	1						
ans-1,3-Dichloropropene	ND	0.0100	mg/Kg	1						
..ans-1,4-Dichloro-2-butene	ND	0.0500	mg/Kg	1						
Trichloroethene	ND	0.0100	mg/Kg	1						
richlorofluoromethane	ND	0.0100	mg/Kg	1						
'inyl acetate	ND	0.0500	mg/Kg	1						
Vinyl chloride	ND	0.0500	mg/Kg	1						
Surr: 1,2-Dichloroethane-d4	97.1	58-180	%REC	1						
Surr: 4-Bromofluorobenzene	118	69-173	%REC	1						
Surr: Dibromofluoromethane	100	71-142	%REC	1						
Surr: Toluene-d8	102	87-126	%REC	1						

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

* - Value exceeds Maximum Contaminant Level

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

Oceanic Analytical Laboratory, Inc.

Date: *Dec 02, 2003*

Client:	Edward K. Noda & Associates	**Client Sample ID:**	N3-5.0
Lab Order:	0311088	**Tag Number:**	
Project:	Upgrade Electrical System, Phase 1, Hickam AFB	**Collection Date:**	11/11/2003 15:52
Lab ID:	0311088-14A	**Matrix:**	SOIL

Analyses	Result	Reporting Limit	Units	Dilution Factor	Date Prepared	Date Analyzed	Batch ID	Analyst	Qual	Notes
ICP METALS, TCLP LEACHED			**SW1311/6010B**							
Arsenic	ND	0.500	mg/L	1	11/26/2003	11/26/2003	8449	TKL		
Barium	ND	1.00	mg/L	1						
Cadmium	ND	0.0500	mg/L	1						
Chromium	ND	0.100	mg/L	1						
Lead	ND	0.200	mg/L	1						
Selenium	ND	0.500	mg/L	1						
Silver	ND	0.200	mg/L	1						
ICP METALS-RCRA, TOTAL			**SW6010B**							
Arsenic	ND	5.00	mg/Kg	1	11/21/2003	11/21/2003	8413	TKL		
Cadmium	ND	2.00	mg/Kg	1						
Chromium	23.1	5.00	mg/Kg	1						
Lead	ND	20.0	mg/Kg	1						
MERCURY, TCLP LEACHED			**SW1311/7470**							
Mercury	ND	0.00250	mg/L	1	11/25/2003	11/25/2003	8440	SYL		
PAH BY EPA 8270 SIM			**SW8270C**							
Acenaphthene	ND	0.00667	mg/Kg	1	11/17/2003	11/27/2003	8367	SLK		
Benzo(a)pyrene	ND	0.00667	mg/Kg	1						
Fluoranthene	ND	0.00667	mg/Kg	1						
Naphthalene	ND	0.00667	mg/Kg	1						
Surr: 2-Fluorobiphenyl	55.0	30-115	%REC	1						
Surr: 4-Terphenyl-d14	56.9	18-137	%REC	1						
Surr: Nitrobenzene-d5	53.2	23-120	%REC	1						
PCBS IN SOIL OR SOLID WASTE			**SW8082**							
Aroclor 1016	ND	0.0327	mg/Kg	1	11/21/2003	11/22/2003	8408	SLK		
Aroclor 1221	ND	0.0654	mg/Kg	1						
Aroclor 1232	ND	0.0327	mg/Kg	1						
Aroclor 1242	ND	0.0327	mg/Kg	1						
Aroclor 1248	ND	0.0327	mg/Kg	1						
Aroclor 1254	ND	0.0327	mg/Kg	1						
Aroclor 1260	ND	0.0327	mg/Kg	1						
Surr: Decachlorobiphenyl	113	24-154	%REC	1						

Qualifiers:

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R - RPD outside accepted recovery limits

E - Value above quantitation range

Oceanic Analytical Laboratory, Inc.

Date: *Dec 02, 2003*

lient:	Edward K. Noda & Associates	**Client Sample ID:**	N3-5.0
Lab Order:	0311088	**Tag Number:**	
Project:	Upgrade Electrical System, Phase 1, Hickam AFB	**Collection Date:**	11/11/2003 15:52
ab ID:	0311088-14A	**Matrix:**	SOIL

nalyses	Result	Reporting Limit	Units	Dilution Factor	Date Prepared	Date Analyzed	Batch ID	Analyst	Qual	Notes
PH (FUEL FINGERPRINT)			**SW8015M**							
TPH (Diesel)	ND	5.00	mg/Kg	1	11/17/2003	11/19/2003	8368	MDH		
TPH (Jet A)	ND	5.00	mg/Kg	1						
TPH (JP-4)	ND	5.00	mg/Kg	1						
TPH (JP-5)	ND	5.00	mg/Kg	1						
TPH (Kerosene)	ND	5.00	mg/Kg	1						
TPH (Motor Oil)	ND	20.0	mg/Kg	1						
TPH (Paint Thinner)	ND	5.00	mg/Kg	1						
TPH (Unidentifed Hydrocarbons as Diesel)	ND	5.00	mg/Kg	1						
TPH (Unidentifed Hydrocarbons as Motor Oil)	ND	20.0	mg/Kg	1						
Surr: Pentacosane	76.3	31-152	%REC	1						

Qualifiers:

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S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

Oceanic Analytical Laboratory, Inc.

Date: *Dec 02, 2003*

Client:	Edward K. Noda & Associates	**Client Sample ID:**	N3-5.0
Lab Order:	0311088	**Tag Number:**	
Project:	Upgrade Electrical System, Phase 1, Hickam AFB	**Collection Date:**	11/11/2003 15:52
Lab ID:	0311088-14B	**Matrix:**	SOIL

Analyses	Result	Reporting Limit	Units	Dilution Factor	Date Prepared	Date Analyzed	Batch ID	Analyst	Qual	Notes
TPH GASOLINE W/BTEX			**SW5030/8015M/8021B**							
Benzene	ND	0.0100	mg/Kg	1	11/25/2003	11/25/2003	R22442	SJR		
Ethylbenzene	ND	0.0100	mg/Kg	1						
m,p-Xylene	ND	0.0200	mg/Kg	1						
o-Xylene	ND	0.0100	mg/Kg	1						
Toluene	ND	0.0100	mg/Kg	1						
TPH (Gasoline C6-C12)	ND	1.00	mg/Kg	1						
Surr: a,a,a-Trifluorotoluene	81.0	54-126	%REC	1						

Qualifiers:

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* - Value exceeds Maximum Contaminant Level

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

)ceanic Analytical Laboratory, Inc.

Date: *Dec 02, 2003*

'li ıt:	Edward K. Noda & Associates	**Client Sample ID:**	N3-5.0
.ab Order:	0311088	**Tag Number:**	
'rı ect:	Upgrade Electrical System, Phase 1, Hickam AFB	**Collection Date:**	11/11/2003 15:52
.a ID:	0311088-14B	**Matrix:**	SOIL

\n: ses	Result	Reporting Limit	Units	Dilution Factor	Date Prepared	Date Analyzed	Batch ID	Analyst	Qual	Notes
/O_ATILES BY GC/MS			**SW8260B**							
1,1,1,2-Tetrachloroethane	ND	0.0100	mg/Kg	1	11/22/2003	11/22/2003	R22378	KAL		
1, -Trichloroethane	ND	0.0100	mg/Kg	1						
1, ,2-Tetrachloroethane	ND	0.0100	mg/Kg	1						
1,1,2-Trichloroethane	ND	0.0100	mg/Kg	1						
1,1-Dichloroethane	ND	0.0500	mg/Kg	1						
1,)ichloroethene	ND	0.0100	mg/Kg	1						
1, ,-Dichloropropene	ND	0.0100	mg/Kg	1						
1,2,3-Trichlorobenzene	ND	0.0100	mg/Kg	1						
1, -Trichloropropane	ND	0.0100	mg/Kg	1						
1, -Trichlorobenzene	ND	0.0500	mg/Kg	1						
1,2,4-Trimethylbenzene	ND	0.0100	mg/Kg	1						
1, Dibromo-3-chloropropane	ND	0.0100	mg/Kg	1						
1,)ibromoethane	ND	0.0100	mg/Kg	1						
1,2-Dichlorobenzene	ND	0.0500	mg/Kg	1						
1,2-Dichloroethane	ND	0.0100	mg/Kg	1						
1,)ichloropropane	ND	0.0100	mg/Kg	1						
1, 5-Trimethylbenzene	ND	0.0100	mg/Kg	1						
1,3-Dichlorobenzene	ND	0.0500	mg/Kg	1						
1,)ichloropropane	ND	0.0100	mg/Kg	1						
1,)ichlorobenzene	ND	0.0500	mg/Kg	1						
2,2-Dichloropropane	ND	0.0100	mg/Kg	1						
2-Butanone	ND	0.0500	mg/Kg	1						
2- ılorotoluene	ND	0.0100	mg/Kg	1						
2-Hexanone	ND	0.0500	mg/Kg	1						
4-Chlorotoluene	ND	0.0100	mg/Kg	1						
4-)propyltoluene	ND	0.0100	mg/Kg	1						
4- ethyl-2-pentanone	ND	0.0500	mg/Kg	1						
Acetone	ND	0.0500	mg/Kg	1						
Ac lonitrile	ND	0.0500	mg/Kg	1						
Bı zene	ND	0.0100	mg/Kg	1						
Bromobenzene	ND	0.0100	mg/Kg	1						
Bromochloromethane	ND	0.0500	mg/Kg	1						
Bı nodichloromethane	ND	0.0100	mg/Kg	1						
Bı .noform	ND	0.0100	mg/Kg	1						
Bromomethane	ND	0.100	mg/Kg	1						
C)on disulfide	ND	0.0100	mg/Kg	1						
C.)on tetrachloride	ND	0.0100	mg/Kg	1						
Chlorobenzene	ND	0.0100	mg/Kg	1						
C)roethane	ND	0.0500	mg/Kg	1						
C)roform	ND	0.0100	mg/Kg	1						

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

* - Value exceeds Maximum Contaminant Level

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

Oceanic Analytical Laboratory, Inc.

Date: *Dec 02, 2003*

Client:	Edward K. Noda & Associates	**Client Sample ID:**	N3-5.0
Lab Order:	0311088	**Tag Number:**	
Project:	Upgrade Electrical System, Phase 1, Hickam AFB	**Collection Date:**	11/11/2003 15:52
Lab ID:	0311088-14B	**Matrix:**	SOIL

Analyses	Result	Reporting Limit	Units	Dilution Factor	Date Prepared	Date Analyzed	Batch ID	Analyst	Qual	Notes
Chloromethane	ND	0.0500	mg/Kg	1						
cis-1,2-Dichloroethene	ND	0.0100	mg/Kg	1						
cis-1,3-Dichloropropene	ND	0.0100	mg/Kg	1						
Dibromochloromethane	ND	0.0100	mg/Kg	1						
Dibromomethane	ND	0.0100	mg/Kg	1						
Dichlorodifluoromethane	ND	0.0500	mg/Kg	1						
Ethylbenzene	ND	0.0100	mg/Kg	1						
Hexachlorobutadiene	ND	0.0500	mg/Kg	1						
Iodomethane	ND	0.0500	mg/Kg	1						
Isopropylbenzene	ND	0.0100	mg/Kg	1						
m,p-Xylene	ND	0.0100	mg/Kg	1						
Methyl tert-butyl ether	ND	0.00500	mg/Kg	1						
Methylene chloride	ND	0.0500	mg/Kg	1						
n-Butylbenzene	ND	0.0100	mg/Kg	1						
n-Propylbenzene	ND	0.0100	mg/Kg	1						
Naphthalene	ND	0.0500	mg/Kg	1						
o-Xylene	ND	0.0100	mg/Kg	1						
sec-Butylbenzene	ND	0.0100	mg/Kg	1						
Styrene	ND	0.0100	mg/Kg	1						
tert-Butylbenzene	ND	0.0100	mg/Kg	1						
Tetrachloroethene	ND	0.0100	mg/Kg	1						
Toluene	ND	0.0100	mg/Kg	1						
trans-1,2-Dichloroethene	ND	0.0100	mg/Kg	1						
trans-1,3-Dichloropropene	ND	0.0100	mg/Kg	1						
trans-1,4-Dichloro-2-butene	ND	0.0500	mg/Kg	1						
Trichloroethene	ND	0.0100	mg/Kg	1						
Trichlorofluoromethane	ND	0.0100	mg/Kg	1						
Vinyl acetate	ND	0.0500	mg/Kg	1						
Vinyl chloride	ND	0.0500	mg/Kg	1						
Surr: 1,2-Dichloroethane-d4	90.0	58-180	%REC	1						
Surr: 4-Bromofluorobenzene	116	69-173	%REC	1						
Surr: Dibromofluoromethane	99.8	71-142	%REC	1						
Surr: Toluene-d8	95.9	87-126	%REC	1						

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

* - Value exceeds Maximum Contaminant Level

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

Oceanic Analytical Laboratory, Inc.

Date: *Dec 02, 2003*

Client: Edward K. Noda & Associates
Lab Order: 0311088
Project: Upgrade Electrical System, Phase 1, Hickam AF

QC SUMMARY REPORT

Method Blank

Sample ID: **MB-8440** Batch ID: **8440** Test Code: **SW1311/7470** Prep Date: **11/25/2003** Units: **mg/L**
Client ID: Run ID: **MERC_031125B** Analysis Date: **11/25/2003** Notes:

Analyte	Result	PQL	DF	Spike Value	Spike Ref Val	%REC	%REC Limits	RPD Ref Val	RPD	RPD Limit	Qual	Note
Mercury	ND	0.0025	1									

Sample ID: **MB-8417** Batch ID: **8417** Test Code: **SW1311/6010B** Prep Date: **11/21/2003** Units: **mg/L**
Client ID: Run ID: **ICP1_031121D** Analysis Date: **11/21/2003** Notes:

Analyte	Result	PQL	DF	Spike Value	Spike Ref Val	%REC	%REC Limits	RPD Ref Val	RPD	RPD Limit	Qual	Note
Arsenic	ND	0.50	1									
Barium	0.06592	1.0	1								J	
Cadmium	ND	0.050	1									
Chromium	ND	0.10	1									
Lead	0.01696	0.20	1								J	
Selenium	ND	0.50	1									
Silver	ND	0.20	1									

Sample ID: **MB-8449** Batch ID: **8449** Test Code: **SW1311/6010B** Prep Date: **11/26/2003** Units: **mg/L**
Client ID: Run ID: **ICP1_031126A** Analysis Date: **11/26/2003** Notes:

Analyte	Result	PQL	DF	Spike Value	Spike Ref Val	%REC	%REC Limits	RPD Ref Val	RPD	RPD Limit	Qual	Note
Arsenic	ND	0.50	1									
Barium	0.05476	1.0	1								J	
Cadmium	ND	0.050	1									
Chromium	ND	0.10	1									
Lead	0.01834	0.20	1								J	
Selenium	ND	0.50	1									
Silver	ND	0.20	1									

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
%REC - % Recovery
S - Spike Recovery outside established recovery limits
R - RPD outside established recovery limits
DF - Dilution Factor
RPD - Relative Percent Difference

Oceanic Analytical Laboratory, Inc.

Date: *Dec 02, 2003*

Client: Edward K. Noda & Associates
Lab Order: 0311088
Project: Upgrade Electrical System, Phase 1, Hickam AF

QC SUMMARY REPORT

Method Blank

Sample ID: **MB-8378** Batch ID: **8378** Test Code: **SW8082** Prep Date: **11/18/2003** Units: **mg/Kg**
Client ID: Run ID: **GC1A_031119A** Analysis Date: **11/19/2003** Notes:

Analyte	Result	PQL	DF	Spike Value	Spike Ref Val	%REC	%REC Limits		RPD Ref Val	RPD	RPD Limit	Qual	Note
Aroclor 1016	ND	0.033	1										
Aroclor 1221	ND	0.067	1										
Aroclor 1232	ND	0.033	1										
Aroclor 1242	ND	0.033	1										
Aroclor 1248	ND	0.033	1										
Aroclor 1254	ND	0.033	1										
Aroclor 1260	ND	0.033	1										
Surr: Decachlorobiphenyl	0.04183	0	1	0.03333	0	125	24	154	0				A01

Sample ID: **MB-8408** Batch ID: **8408** Test Code: **SW8082** Prep Date: **11/21/2003** Units: **mg/Kg**
Client ID: Run ID: **GC6A_031121A** Analysis Date: **11/21/2003** Notes:

Analyte	Result	PQL	DF	Spike Value	Spike Ref Val	%REC	%REC Limits		RPD Ref Val	RPD	RPD Limit	Qual	Note
Aroclor 1016	ND	0.033	1										
Aroclor 1221	ND	0.067	1										
Aroclor 1232	ND	0.033	1										
Aroclor 1242	ND	0.033	1										
Aroclor 1248	ND	0.033	1										
Aroclor 1254	ND	0.033	1										
Aroclor 1260	ND	0.033	1										
Surr: Decachlorobiphenyl	0.03971	0	1	0.03333	0	119	24	154	0				

Qualifiers:

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
%REC - % Recovery
S - Spike Recovery outside established recovery limits
R - RPD outside established recovery limits
DF - Dilution Factor
RPD - Relative Percent Difference

Oceanic Analytical Laboratory, Inc.

Date: *Dec 02, 2003*

(ient: Edward K. Noda & Associates
Lab Order: 0311088
Г oject: Upgrade Electrical System, Phase 1, Hickam AF

QC SUMMARY REPORT

Method Blank

Sample ID: **MBLKs112003** Batch ID: **R22373** Test Code: **SW8260B** Prep Date: **11/20/2003** Units: **mg/Kg**

(ɔnt ID: Run ID: **MSD1_031120A** Analysis Date: **11/20/2003** Notes:

Analyte	Result	PQL	DF	Spike Value	Spike Ref Val	%REC	%REC Limits	RPD Ref Val	RPD	RPD Limit	Qual	Note
,1,2-Tetrachloroethane	ND	0.010	1									
·, ·,1-Trichloroethane	ND	0.010	1									
1,1,2,2-Tetrachloroethane	ND	0.010	1									
,2-Trichloroethane	ND	0.010	1									
-Dichloroethane	ND	0.050	1									
1,1-Dichloroethene	ND	0.010	1									
1 1-Dichloropropene	ND	0.010	1									
,3-Trichlorobenzene	0.00588	0.010	1								J	
1,2,3-Trichloropropane	0.00188	0.010	1								J	
1,2,4-Trichlorobenzene	ND	0.050	1									
,4-Trimethylbenzene	0.00268	0.010	1								J	
-Dibromo-3-chloropropane	ND	0.010	1									
1,2-Dibromoethane	ND	0.010	1									
-Dichlorobenzene	ND	0.050	1									
-Dichloroethane	ND	0.010	1									
1,2-Dichloropropane	ND	0.010	1									
1,3,5-Trimethylbenzene	0.0011	0.010	1								J	
-Dichlorobenzene	ND	0.050	1									
-Dichloropropane	ND	0.010	1									
1,4-Dichlorobenzene	ND	0.050	1									
-Dichloropropane	ND	0.010	1									
utanone	0.01282	0.050	1								J	
2-Chlorotoluene	ND	0.010	1									
2-Hexanone	0.00056	0.050	1								J	
Chlorotoluene	ND	0.010	1									
4-Isopropyltoluene	ND	0.010	1									
4-Methyl-2-pentanone	0.0025	0.050	1								J	
etone	0.0124	0.050	1								J	
ylonitrile	ND	0.050	1									
Benzene	ND	0.010	1									
omobenzene	ND	0.010	1									
omochloromethane	ND	0.050	1									
Bromodichloromethane	ND	0.010	1									
Bromoform	ND	0.010	1									
omomethane	0.0026	0.10	1								J	
Carbon disulfide	ND	0.010	1									
Carbon tetrachloride	ND	0.010	1									
lorobenzene	ND	0.010	1									

Qualifiers:

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
%REC - % Recovery
S - Spike Recovery outside established recovery limits
R - RPD outside established recovery limits
DF - Dilution Factor
RPD - Relative Percent Difference

Oceanic Analytical Laboratory, Inc.

Date: *Dec 02, 2003*

Client: Edward K. Noda & Associates
Lab Order: 0311088
Project: Upgrade Electrical System, Phase 1, Hickam AF

QC SUMMARY REPORT

Method Blank

Chloroethane	ND	0.050	1							
Chloroform	ND	0.010	1							
Chloromethane	ND	0.050	1							
cis-1,2-Dichloroethene	ND	0.010	1							
cis-1,3-Dichloropropene	ND	0.010	1							
Dibromochloromethane	ND	0.010	1							
Dibromomethane	ND	0.010	1							
Dichlorodifluoromethane	ND	0.050	1							
Ethylbenzene	ND	0.010	1							
Hexachlorobutadiene	ND	0.050	1							
Iodomethane	ND	0.050	1							
Isopropylbenzene	ND	0.010	1							
m,p-Xylene	ND	0.010	1							
Methyl tert-butyl ether	ND	0.0050	1							
Methylene chloride	0.00524	0.050	1							J
n-Butylbenzene	ND	0.010	1							
n-Propylbenzene	ND	0.010	1							
Naphthalene	0.00472	0.050	1							J
o-Xylene	ND	0.010	1							
sec-Butylbenzene	ND	0.010	1							
Styrene	ND	0.010	1							
tert-Butylbenzene	ND	0.010	1							
Tetrachloroethene	ND	0.010	1							
Toluene	ND	0.010	1							
trans-1,2-Dichloroethene	ND	0.010	1							
trans-1,3-Dichloropropene	ND	0.010	1							
trans-1,4-Dichloro-2-butene	ND	0.050	1							
Trichloroethene	ND	0.010	1							
Trichlorofluoromethane	ND	0.010	1							
Vinyl acetate	ND	0.050	1							
Vinyl chloride	ND	0.050	1							
Surr: 1,2-Dichloroethane-d4	0.09648	0	1	0.1	0	96.5	58	180	0	
Surr: 4-Bromofluorobenzene	0.1133	0	1	0.1	0	113	69	173	0	
Surr: Dibromofluoromethane	0.09746	0	1	0.1	0	97.5	71	142	0	
Surr: Toluene-d8	0.1011	0	1	0.1	0	101	87	126	0	

Qualifiers:

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
%REC - % Recovery
S - Spike Recovery outside established recovery limits
R - RPD outside established recovery limits
DF - Dilution Factor
RPD - Relative Percent Difference

Oceanic Analytical Laboratory, Inc.

Date: *Dec 02, 2003*

(ent:	Edward K. Noda & Associates
Lab Order:	0311088
P⁻⁻ject:	Upgrade Electrical System, Phase 1, Hickam AF

QC SUMMARY REPORT
Method Blank

Sample ID: **MBLKs112103** Batch ID: **R22378** Test Code: **SW8260B** Prep Date: **11/21/2003** Units: **mg/Kg**

C nt ID: Run ID: **MSD1_031121A** Analysis Date: **11/21/2003** Notes:

Analyte	Result	PQL	DF	Spike Value	Spike Ref Val	%REC	%REC Limits	RPD Ref Val	RPD	RPD Limit	Qual	Note
1 1,2-Tetrachloroethane	ND	0.010	1									
1. .1-Trichloroethane	ND	0.010	1									
1,1,2,2-Tetrachloroethane	ND	0.010	1									
1 2-Trichloroethane	ND	0.010	1									
1 Dichloroethane	ND	0.050	1									
1,1-Dichloroethene	ND	0.010	1									
1.1-Dichloropropene	ND	0.010	1									
1 3-Trichlorobenzene	ND	0.010	1									
1,.,3-Trichloropropane	0.00218	0.010	1								J	
1,2,4-Trichlorobenzene	ND	0.050	1									
1 4-Trimethylbenzene	0.00288	0.010	1								J	
1 Dibromo-3-chloropropane	ND	0.010	1									
1,2-Dibromoethane	ND	0.010	1									
1 ? Dichlorobenzene	ND	0.050	1									
1 Dichloroethane	ND	0.010	1									
1,2-Dichloropropane	ND	0.010	1									
1,3,5-Trimethylbenzene	0.0012	0.010	1								J	
1 Dichlorobenzene	ND	0.050	1									
1, Dichloropropane	ND	0.010	1									
1,4-Dichlorobenzene	ND	0.050	1									
2, Dichloropropane	ND	0.010	1									
2- ıtanone	0.01276	0.050	1								J	
2-Chlorotoluene	ND	0.010	1									
2-Hexanone	0.00068	0.050	1								J	
4- ılorotoluene	ND	0.010	1									
4-ıopropyltoluene	ND	0.010	1									
4-Methyl-2-pentanone	0.0026	0.050	1								J	
A tone	0.01204	0.050	1								J	
A ılonitrile	ND	0.050	1									
Benzene	ND	0.010	1									
B nobenzene	ND	0.010	1									
B nochloromethane	ND	0.050	1									
Bromodichloromethane	ND	0.010	1									
Bromoform	ND	0.010	1									
B nomethane	0.00208	0.10	1								J	
C..oon disulfide	ND	0.010	1									
Carbon tetrachloride	ND	0.010	1									
C: ırobenzene	ND	0.010	1									

Qualifiers:

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
%REC - % Recovery
S - Spike Recovery outside established recovery limits
R - RPD outside established recovery limits
DF - Dilution Factor
RPD - Relative Percent Difference

Oceanic Analytical Laboratory, Inc. Date: *Dec 02, 2003*

Client: Edward K. Noda & Associates
Lab Order: 0311088
Project: Upgrade Electrical System, Phase 1, Hickam AF

QC SUMMARY REPORT

Method Blank

Chloroethane	ND	0.050	1							
Chloroform	ND	0.010	1							
Chloromethane	ND	0.050	1							
cis-1,2-Dichloroethene	ND	0.010	1							
cis-1,3-Dichloropropene	ND	0.010	1							
Dibromochloromethane	ND	0.010	1							
Dibromomethane	ND	0.010	1							
Dichlorodifluoromethane	ND	0.050	1							
Ethylbenzene	ND	0.010	1							
Hexachlorobutadiene	ND	0.050	1							
Iodomethane	ND	0.050	1							
Isopropylbenzene	ND	0.010	1							
m,p-Xylene	ND	0.010	1							
Methyl tert-butyl ether	ND	0.0050	1							
Methylene chloride	0.00274	0.050	1							J
n-Butylbenzene	ND	0.010	1							
n-Propylbenzene	ND	0.010	1							
Naphthalene	0.00454	0.050	1							J
o-Xylene	ND	0.010	1							
sec-Butylbenzene	ND	0.010	1							
Styrene	ND	0.010	1							
tert-Butylbenzene	ND	0.010	1							
Tetrachloroethene	ND	0.010	1							
Toluene	ND	0.010	1							
trans-1,2-Dichloroethene	ND	0.010	1							
trans-1,3-Dichloropropene	ND	0.010	1							
trans-1,4-Dichloro-2-butene	ND	0.050	1							
Trichloroethene	ND	0.010	1							
Trichlorofluoromethane	ND	0.010	1							
Vinyl acetate	ND	0.050	1							
Vinyl chloride	ND	0.050	1							
Surr: 1,2-Dichloroethane-d4	0.1035	0	1	0.1	0	104	58	180	0	
Surr: 4-Bromofluorobenzene	0.1097	0	1	0.1	0	110	69	173	0	
Surr: Dibromofluoromethane	0.0981	0	1	0.1	0	98.1	71	142	0	
Surr: Toluene-d8	0.09784	0	1	0.1	0	97.8	87	126	0	

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
%REC - % Recovery
S - Spike Recovery outside established recovery limits
R - RPD outside established recovery limits
DF - Dilution Factor
RPD - Relative Percent Difference

ᴜceanic Analytical Laboratory, Inc.

Date: *Dec 02, 2003*

.ient: Edward K. Noda & Associates
Lab Order: 0311088
ᴾroject: Upgrade Electrical System, Phase 1, Hickam AF

QC SUMMARY REPORT

Method Blank

Sample ID: **MBLK112003** Batch ID: **R22368** Test Code: **SW5030/8015M/8021B** Prep Date: **11/20/2003** Units: **mg/Kg**
ent ID: Run ID: **GC4A_031120B** Analysis Date: **11/20/2003** Notes:

Analyte	Result	PQL	DF	Spike Value	Spike Ref Val	%REC	%REC Limits	RPD Ref Val	RPD	RPD Limit	Qual	Note
'H (Gasoline C6-C12)	0.1152	0.20	1								J	
nzene	ND	0.0020	1									
Ethylbenzene	ND	0.0020	1									
p-Xylene	ND	0.0040	1									
‹ylene	ND	0.0020	1									
oluene	ND	0.0020	1									
Surr: a,a,a-Trifluorotoluene	0.05496	0	1	0.06	0	91.6	54 126	0				

mple ID: **MBLK112103** Batch ID: **R22388** Test Code: **SW5030/8015M/8021B** Prep Date: **11/21/2003** Units: **mg/Kg**
Client ID: Run ID: **GC7A_031121B** Analysis Date: **11/21/2003** Notes:

Analyte	Result	PQL	DF	Spike Value	Spike Ref Val	%REC	%REC Limits	RPD Ref Val	RPD	RPD Limit	Qual	Note
TPH (Gasoline C6-C12)	0.548	1.0	1								J	
nzene	0.00084	0.010	1								J	
..ylbenzene	0.00129	0.010	1								J	
m,p-Xylene	0.00339	0.020	1								J	
‹ylene	0.00117	0.010	1								J	
uene	0.00127	0.010	1								J	
Surr: a,a,a-Trifluorotoluene	0.3028	0	1	0.3	0	101	54 126	0				

nple ID: **MBLK112503** Batch ID: **R22442** Test Code: **SW5030/8015M/8021B** Prep Date: **11/25/2003** Units: **mg/Kg**
Client ID: Run ID: **GC7A_031125A** Analysis Date: **11/25/2003** Notes:

Analyte	Result	PQL	DF	Spike Value	Spike Ref Val	%REC	%REC Limits	RPD Ref Val	RPD	RPD Limit	Qual	Note
TPH (Gasoline C6-C12)	0.615	1.0	1								J	
nzene	ND	0.010	1									
ylbenzene	ND	0.010	1									
m,p-Xylene	ND	0.020	1									
o-Xylene	ND	0.010	1									
uene	ND	0.010	1									
Surr: a,a,a-Trifluorotoluene	0.2532	0	1	0.3	0	84.4	54 126	0				

Qualifiers:
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%REC - % Recovery
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R - RPD outside established recovery limits
DF - Dilution Factor
RPD - Relative Percent Difference

Oceanic Analytical Laboratory, Inc.

Date: *Dec 02, 2003*

Client: Edward K. Noda & Associates
Lab Order: 0311088
Project: Upgrade Electrical System, Phase 1, Hickam AF

QC SUMMARY REPORT

Method Blank

Sample ID: **MB-8413** Batch ID: **8413** Test Code: **SW6010B** Prep Date: **11/21/2003** Units: **mg/Kg**
Client ID: Run ID: **ICP1_031121A** Analysis Date: **11/21/2003** Notes:

Analyte	Result	PQL	DF	Spike Value	Spike Ref Val	%REC	%REC Limits	RPD Ref Val	RPD	RPD Limit	Qual	Note
Arsenic	ND	5.0	1									
Cadmium	ND	2.0	1									
Chromium	ND	5.0	1									
Lead	0.2393	20	1								J	

Sample ID: **MB-8367** Batch ID: **8367** Test Code: **SW8270C** Prep Date: **11/17/2003** Units: **mg/Kg**
Client ID: Run ID: **MSD3_031123A** Analysis Date: **11/23/2003** Notes:

Analyte	Result	PQL	DF	Spike Value	Spike Ref Val	%REC	%REC Limits	RPD Ref Val	RPD	RPD Limit	Qual	Note
Acenaphthene	0.003667	0.0067	1								J	
Benzo(a)pyrene	0.003	0.0067	1								J	
Fluoranthene	ND	0.0067	1									
Naphthalene	ND	0.0067	1									
Surr: 2-Fluorobiphenyl	0.862	0	1	1.67	0	51.6	30 115	0				
Surr: 4-Terphenyl-d14	0.8317	0	1	1.67	0	49.8	18 137	0				
Surr: Nitrobenzene-d5	0.8487	0	1	1.67	0	50.8	23 120	0				

Sample ID: **MB-8368** Batch ID: **8368** Test Code: **SW8015M** Prep Date: **11/17/2003** Units: **mg/Kg**
Client ID: Run ID: **GC2B_031118A** Analysis Date: **11/18/2003** Notes:

Analyte	Result	PQL	DF	Spike Value	Spike Ref Val	%REC	%REC Limits	RPD Ref Val	RPD	RPD Limit	Qual	Note
TPH (Diesel)	ND	5.0	1									
TPH (Jet A)	ND	5.0	1									
TPH (JP-4)	ND	5.0	1									
TPH (JP-5)	ND	5.0	1									
TPH (Kerosene)	ND	5.0	1									
TPH (Motor Oil)	ND	20	1									
TPH (Paint Thinner)	ND	5.0	1									
TPH (Unidentifed Hydrocarbons as Di	ND	5.0	1									
TPH (Unidentifed Hydrocarbons as M	ND	20	1									
Surr: Pentacosane	1.26	0	1	1.67	0	75.5	31 152	0				

Qualifiers:
ND - Not Detected at the Reporting Limit
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R - RPD outside established recovery limits
DF - Dilution Factor
RPD - Relative Percent Difference

Date: *Dec 02, 2003*

Oceanic Analytical Laboratory, Inc.

Client: Edward K. Noda & Associates
Lab Order: 0311088
Project: Upgrade Electrical System, Phase 1, Hickam AF

QC SUMMARY REPORT

Sample Matrix Spike

Sample ID: **0311089-01AMS** Batch ID: **8440** Test Code: **SW1311/7470** Prep Date: **11/25/2003** Units: **mg/L**
Client ID: Run ID: **MERC_031125B** Analysis Date: **11/25/2003** Notes:

Analyte	Result	PQL	DF	Spike Value	Spike Ref Val	%REC	%REC Limits	RPD Ref Val	RPD	RPD Limit	Qual	Note
Mercury	0.01	0.0025	1	0.01	0.00065	93.5	75 125	0				

Sample ID: **0311089-01AMSD** Batch ID: **8440** Test Code: **SW1311/7470** Prep Date: **11/25/2003** Units: **mg/L**
Client ID: Run ID: **MERC_031125B** Analysis Date: **11/25/2003** Notes:

Analyte	Result	PQL	DF	Spike Value	Spike Ref Val	%REC	%REC Limits	RPD Ref Val	RPD	RPD Limit	Qual	Note
Mercury	0.0094	0.0025	1	0.01	0.00065	87.5	75 125	0.01	6.19	20		

Sample ID: **0311087-01AMS** Batch ID: **8417** Test Code: **SW1311/6010B** Prep Date: **11/21/2003** Units: **mg/L**
Client ID: Run ID: **ICP1_031121D** Analysis Date: **11/21/2003** Notes:

Analyte	Result	PQL	DF	Spike Value	Spike Ref Val	%REC	%REC Limits	RPD Ref Val	RPD	RPD Limit	Qual	Note
Arsenic	1.102	0.50	1	1	0	110	80 120	0				
Barium	1.298	1.0	1	1	0.2433	105	80 120	0				
Cadmium	1.05	0.050	1	1	0	105	80 120	0			*	
Chromium	1.025	0.10	1	1	0	103	80 120	0				
Lead	1.051	0.20	1	1	0	105	80 120	0				
Selenium	1.097	0.50	1	1	0	110	80 120	0			*	
Silver	1.075	0.20	1	1	0	107	80 120	0				

Sample ID: **0311087-01AMSD** Batch ID: **8417** Test Code: **SW1311/6010B** Prep Date: **11/21/2003** Units: **mg/L**
Client ID: Run ID: **ICP1_031121D** Analysis Date: **11/21/2003** Notes:

Analyte	Result	PQL	DF	Spike Value	Spike Ref Val	%REC	%REC Limits	RPD Ref Val	RPD	RPD Limit	Qual	Note
Arsenic	1.083	0.50	1	1	0	108	80 120	1.102	1.69	20		
Barium	1.293	1.0	1	1	0.2433	105	80 120	1.298	0.355	20		
Cadmium	1.038	0.050	1	1	0	104	80 120	1.05	1.16	20	*	
Chromium	1.018	0.10	1	1	0	102	80 120	1.025	0.724	20		
Lead	1.044	0.20	1	1	0	104	80 120	1.051	0.697	20		
Selenium	1.093	0.50	1	1	0	109	80 120	1.097	0.338	20	*	
Silver	1.077	0.20	1	1	0	108	80 120	1.075	0.223	20		

Qualifiers:

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%REC - % Recovery
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R - RPD outside established recovery limits
DF - Dilution Factor
RPD - Relative Percent Difference

Oceanic Analytical Laboratory, Inc.

Date: *Dec 02, 2003*

Client: Edward K. Noda & Associates
Lab Order: 0311088
Project: Upgrade Electrical System, Phase 1, Hickam AF

QC SUMMARY REPORT

Sample Matrix Spike

Sample ID: **0311088-05AMS** Batch ID: **8449** Test Code: **SW1311/6010B** Prep Date: **11/26/2003** Units: **mg/L**
Client ID: **N7-2.0** Run ID: **ICP1_031126A** Analysis Date: **11/26/2003** Notes:

Analyte	Result	PQL	DF	Spike Value	Spike Ref Val	%REC	%REC Limits		RPD Ref Val	RPD	RPD Limit	Qual	Note
Arsenic	1.053	0.50	1	1	0	105	80	120	0				
Barium	1.977	1.0	1	1	0.945	103	80	120	0				
Cadmium	1.049	0.050	1	1	0	105	80	120	0			*	
Chromium	1.03	0.10	1	1	0	103	80	120	0				
Lead	1.052	0.20	1	1	0	105	80	120	0				
Selenium	1.053	0.50	1	1	0	105	80	120	0			*	
Silver	1.059	0.20	1	1	0	106	80	120	0				

Sample ID: **0311088-05AMSD** Batch ID: **8449** Test Code: **SW1311/6010B** Prep Date: **11/26/2003** Units: **mg/L**
Client ID: **N7-2.0** Run ID: **ICP1_031126A** Analysis Date: **11/26/2003** Notes:

Analyte	Result	PQL	DF	Spike Value	Spike Ref Val	%REC	%REC Limits		RPD Ref Val	RPD	RPD Limit	Qual	Note
Arsenic	1.065	0.50	1	1	0	106	80	120	1.053	1.08	20		
Barium	1.978	1.0	1	1	0.945	103	80	120	1.977	0.0759	20		
Cadmium	1.048	0.050	1	1	0	105	80	120	1.049	0.0858	20	*	
Chromium	1.029	0.10	1	1	0	103	80	120	1.03	0.146	20		
Lead	1.044	0.20	1	1	0	104	80	120	1.052	0.773	20		
Selenium	1.026	0.50	1	1	0	103	80	120	1.053	2.62	20	*	
Silver	1.062	0.20	1	1	0	106	80	120	1.059	0.274	20		

Sample ID: **0311087-02AMS** Batch ID: **8378** Test Code: **SW8082** Prep Date: **11/18/2003** Units: **mg/Kg**
Client ID: Run ID: **GC1A_031119A** Analysis Date: **11/19/2003** Notes:

Analyte	Result	PQL	DF	Spike Value	Spike Ref Val	%REC	%REC Limits		RPD Ref Val	RPD	RPD Limit	Qual	Note
Aroclor 1016	0.1492	0.033	1	0.167	0	89.3	65	128	0				
Aroclor 1260	0.1767	0.033	1	0.167	0	106	63	130	0				
Surr: Decachlorobiphenyl	0.03974	0	1	0.03333	0	119	24	154	0				A01

Sample ID: **0311087-02AMSD** Batch ID: **8378** Test Code: **SW8082** Prep Date: **11/18/2003** Units: **mg/Kg**
Client ID: Run ID: **GC1A_031119A** Analysis Date: **11/19/2003** Notes:

Analyte	Result	PQL	DF	Spike Value	Spike Ref Val	%REC	%REC Limits		RPD Ref Val	RPD	RPD Limit	Qual	Note
Aroclor 1016	0.1515	0.033	1	0.167	0	90.7	65	128	0.1492	1.56	50		
Aroclor 1260	0.167	0.033	1	0.167	0	100	63	130	0.1767	5.6	50		
Surr: Decachlorobiphenyl	0.04244	0	1	0.03333	0	127	24	154	0	0	0		A01

Qualifiers:
- ND - Not Detected at the Reporting Limit
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- B - Analyte detected in the associated Method Blank
- %REC - % Recovery
- S - Spike Recovery outside established recovery limits
- R - RPD outside established recovery limits
- DF - Dilution Factor
- RPD - Relative Percent Difference

Oceanic Analytical Laboratory, Inc.

Date: *Dec 02, 2003*

Client: Edward K. Noda & Associates
Lab Order: 0311088
Project: Upgrade Electrical System, Phase 1, Hickam AF

QC SUMMARY REPORT
Sample Matrix Spike

Sample ID: **0311088-09AMS** Batch ID: **8408** Test Code: **SW8082** Prep Date: **11/21/2003** Units: **mg/Kg**
Client ID: **N5-3.0** Run ID: **GC6A_031121A** Analysis Date: **11/21/2003** Notes:

Analyte	Result	PQL	DF	Spike Value	Spike Ref Val	%REC	%REC Limits	RPD Ref Val	RPD	RPD Limit	Qual	Note
Aroclor 1016	0.1578	0.033	1	0.167	0	94.5	65 128	0				
Aroclor 1260	0.1658	0.033	1	0.167	0	99.3	63 130	0				
Surr: Decachlorobiphenyl	0.04023	0	1	0.03333	0	121	24 154	0				

Sample ID: **0311088-09AMSD** Batch ID: **8408** Test Code: **SW8082** Prep Date: **11/21/2003** Units: **mg/Kg**
Client ID: **N5-3.0** Run ID: **GC6A_031121A** Analysis Date: **11/21/2003** Notes:

Analyte	Result	PQL	DF	Spike Value	Spike Ref Val	%REC	%REC Limits	RPD Ref Val	RPD	RPD Limit	Qual	Note
Aroclor 1016	0.1439	0.033	1	0.167	0	86.2	65 128	0.1578	9.22	50		
Aroclor 1260	0.1503	0.033	1	0.167	0	90	63 130	0.1658	9.81	50		
Surr: Decachlorobiphenyl	0.0384	0	1	0.03333	0	115	24 154	0	0	0		

Sample ID: **0311088-07BMS** Batch ID: **R22373** Test Code: **SW8260B** Prep Date: **11/21/2003** Units: **mg/Kg**
Client ID: **N6-3.0** Run ID: **MSD1_031120A** Analysis Date: **11/21/2003** Notes:

Analyte	Result	PQL	DF	Spike Value	Spike Ref Val	%REC	%REC Limits	RPD Ref Val	RPD	RPD Limit	Qual	Note
1,1-Dichloroethene	0.08108	0.010	1	0.1	0	81.1	56 145	0				
Benzene	0.0909	0.010	1	0.1	0	90.9	66 124	0				
Chlorobenzene	0.09162	0.010	1	0.1	0	91.6	73 119	0				
Methyl tert-butyl ether	0.1905	0.0050	1	0.2	0	95.2	58 131	0				
Toluene	0.08638	0.010	1	0.1	0.0007	85.7	74 116	0				
Trichloroethene	0.1146	0.010	1	0.1	0	115	78 127	0				
Surr: 1,2-Dichloroethane-d4	0.1028	0	1	0.1	0	103	58 180	0				
Surr: 4-Bromofluorobenzene	0.08998	0	1	0.1	0	90	69 173	0				
Surr: Dibromofluoromethane	0.0901	0	1	0.1	0	90.1	71 142	0				
Surr: Toluene-d8	0.09518	0	1	0.1	0	95.2	87 126	0				

Qualifiers:

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
%REC - % Recovery
S - Spike Recovery outside established recovery limits
R - RPD outside established recovery limits
DF - Dilution Factor
RPD - Relative Percent Difference

Oceanic Analytical Laboratory, Inc.

Date: *Dec 02, 2003*

Client: Edward K. Noda & Associates
Lab Order: 0311088
Project: Upgrade Electrical System, Phase 1, Hickam AF

QC SUMMARY REPORT

Sample Matrix Spike Duplicate

Sample ID: **0311088-07BMSD** Batch ID: **R22373** Test Code: **SW8260B** Prep Date: **11/21/2003** Units: **mg/Kg**
Client ID: **N6-3.0** Run ID: **MSD1_031120A** Analysis Date: **11/21/2003** Notes:

Analyte	Result	PQL	DF	Spike Value	Spike Ref Val	%REC	%REC Limits		RPD Ref Val	RPD	RPD Limit	Qual	Note
1,1-Dichloroethene	0.08142	0.010	1	0.1	0	81.4	56	145	0.08108	0.418	25		
Benzene	0.08634	0.010	1	0.1	0	86.3	66	124	0.0909	5.15	25		
Chlorobenzene	0.0836	0.010	1	0.1	0	83.6	73	119	0.09162	9.15	25		
Methyl tert-butyl ether	0.1857	0.0050	1	0.2	0	92.8	58	131	0.1905	2.55	25		
Toluene	0.08416	0.010	1	0.1	0.0007	83.5	74	116	0.08638	2.6	25		
Trichloroethene	0.1028	0.010	1	0.1	0	103	78	127	0.1146	10.9	25		
Surr: 1,2-Dichloroethane-d4	0.09798	0	1	0.1	0	98	58	180	0	0	0		
Surr: 4-Bromofluorobenzene	0.09478	0	1	0.1	0	94.8	69	173	0	0	0		
Surr: Dibromofluoromethane	0.089	0	1	0.1	0	89	71	142	0	0	0		
Surr: Toluene-d8	0.09608	0	1	0.1	0	96.1	87	126	0	0	0		

Sample ID: **0311088-14BMS** Batch ID: **R22378** Test Code: **SW8260B** Prep Date: **11/22/2003** Units: **mg/Kg**
Client ID: **N3-5.0** Run ID: **MSD1_031121A** Analysis Date: **11/22/2003** Notes:

Analyte	Result	PQL	DF	Spike Value	Spike Ref Val	%REC	%REC Limits		RPD Ref Val	RPD	RPD Limit	Qual	Note
1,1-Dichloroethene	0.08392	0.010	1	0.1	0	83.9	56	145	0				
Benzene	0.092	0.010	1	0.1	0	92	66	124	0				
Chlorobenzene	0.08932	0.010	1	0.1	0	89.3	73	119	0				
Methyl tert-butyl ether	0.1785	0.0050	1	0.2	0	89.2	58	131	0				
Toluene	0.0821	0.010	1	0.1	0.00064	81.5	74	116	0				
Trichloroethene	0.09622	0.010	1	0.1	0	96.2	78	127	0				
Surr: 1,2-Dichloroethane-d4	0.08254	0	1	0.1	0	82.5	58	180	0				
Surr: 4-Bromofluorobenzene	0.09256	0	1	0.1	0	92.6	69	173	0				
Surr: Dibromofluoromethane	0.09142	0	1	0.1	0	91.4	71	142	0				
Surr: Toluene-d8	0.08834	0	1	0.1	0	88.3	87	126	0				

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
%REC - % Recovery
S - Spike Recovery outside established recovery limits
R - RPD outside established recovery limits
DF - Dilution Factor
RPD - Relative Percent Difference

Oceanic Analytical Laboratory, Inc.

Date: *Dec 02, 2003*

(ent:	Edward K. Noda & Associates
Lab Order:	0311088
Г ɔject:	Upgrade Electrical System, Phase 1, Hickam AF

QC SUMMARY REPORT

Sample Matrix Spike Duplicate

Sample ID: **0311088-14BMSD** Batch ID: **R22378** Test Code: **SW8260B** Prep Date: **11/22/2003** Units: **mg/Kg**

C ːnt ID: **N3-5.0** Run ID: **MSD1_031121A** Analysis Date: **11/22/2003** Notes:

Analyte	Result	PQL	DF	Spike Value	Spike Ref Val	%REC	%REC Limits	RPD Ref Val	RPD	RPD Limit	Qual	Note
1 -Dichloroethene	0.07952	0.010	1	0.1	0	79.5	56 145	0.08392	5.38	25		
E_.zene	0.09084	0.010	1	0.1	0	90.8	66 124	0.092	1.27	25		
Chlorobenzene	0.09088	0.010	1	0.1	0	90.9	73 119	0.08932	1.73	25		
N :hyl tert-butyl ether	0.1813	0.0050	1	0.2	0	90.6	58 131	0.1785	1.55	25		
T ɹene	0.08926	0.010	1	0.1	0.00064	88.6	74 116	0.0821	8.36	25		
Trichloroethene	0.09778	0.010	1	0.1	0	97.8	78 127	0.09622	1.61	25		
Surr: 1,2-Dichloroethane-d4	0.08754	0	1	0.1	0	87.5	58 180	0	0	0		
ʒurr: 4-Bromofluorobenzene	0.09194	0	1	0.1	0	91.9	69 173	0	0	0		
ʒurr: Dibromofluoromethane	0.09164	0	1	0.1	0	91.6	71 142	0	0	0		
Surr: Toluene-d8	0.09804	0	1	0.1	0	98	87 126	0	0	0		

ʕ nple ID: **0311088-03BMS** Batch ID: **R22368** Test Code: **SW5030/8015M/8021B** Prep Date: **11/20/2003** Units: **mg/Kg**

Client ID: **N8-3.0** Run ID: **GC4A_031120B** Analysis Date: **11/20/2003** Notes:

Analyte	Result	PQL	DF	Spike Value	Spike Ref Val	%REC	%REC Limits	RPD Ref Val	RPD	RPD Limit	Qual	Note
TPH (Gasoline C6-C12)	1.43	0.20	1	2.2	0.1556	57.9	68 111	0			S	Q02
E ızene	0.05264	0.0020	1	0.0324	0.01914	103	88 117	0				
E ylbenzene	0.02486	0.0020	1	0.0348	0	71.4	91 113	0			S	Q02
m,p-Xylene	0.07652	0.0040	1	0.1296	0	59	89 116	0			S	Q02
c ylene	0.03476	0.0020	1	0.0504	0	69	93 115	0			S	Q02
T ɹene	0.1053	0.0020	1	0.1556	0	67.7	90 115	0			S	Q02
Surr: a,a,a-Trifluorotoluene	0.04668	0	1	0.06	0	77.8	54 126	0				

ʕ nple ID: **0311088-03BMSD** Batch ID: **R22368** Test Code: **SW5030/8015M/8021B** Prep Date: **11/21/2003** Units: **mg/Kg**

Client ID: **N8-3.0** Run ID: **GC4A_031120B** Analysis Date: **11/21/2003** Notes:

ʎ ɪalyte	Result	PQL	DF	Spike Value	Spike Ref Val	%REC	%REC Limits	RPD Ref Val	RPD	RPD Limit	Qual	Note
TPH (Gasoline C6-C12)	1.494	0.20	1	2.2	0.1556	60.8	68 111	1.43	4.38	25	S	Q02
B⁻ızene	0.0595	0.0020	1	0.0324	0.01914	125	88 117	0.05264	12.2	25	S	Q02
E ylbenzene	0.02556	0.0020	1	0.0348	0	73.4	91 113	0.02486	2.78	25	S	Q02
m,p-Xylene	0.08346	0.0040	1	0.1296	0	64.4	89 116	0.07652	8.68	25	S	Q02
o-Xylene	0.03598	0.0020	1	0.0504	0	71.4	93 115	0.03476	3.45	25	S	Q02
T uene	0.1084	0.0020	1	0.1556	0	69.6	90 115	0.1053	2.88	25	S	Q02
ʒurr: a,a,a-Trifluorotoluene	0.04714	0	1	0.06	0	78.6	54 126	0	0	0		

Qualifiers:

ND - Not Detected at the Reporting Limit	S - Spike Recovery outside established recovery limits
J - Analyte detected below quantitation limits	R - RPD outside established recovery limits
B - Analyte detected in the associated Method Blank	DF - Dilution Factor
%REC - % Recovery	RPD - Relative Percent Difference

Oceanic Analytical Laboratory, Inc.

Date: *Dec 02, 2003*

Client: Edward K. Noda & Associates
Lab Order: 0311088
Project: Upgrade Electrical System, Phase 1, Hickam AF

QC SUMMARY REPORT

Sample Matrix Spike

Sample ID: **0311088-08BMS** Batch ID: **R22388** Test Code: **SW5030/8015M/8021B** Prep Date: **11/21/2003** Units: **mg/Kg**
Client ID: **N6-10.0** Run ID: **GC7A_031121B** Analysis Date: **11/21/2003** Notes:

Analyte	Result	PQL	DF	Spike Value	Spike Ref Val	%REC	%REC Limits		RPD Ref Val	RPD	RPD Limit	Qual	Note
TPH (Gasoline C6-C12)	9.94	1.0	1	11	0.955	81.7	68	111	0				
Benzene	0.153	0.010	1	0.162	0	94.4	88	117	0				
Ethylbenzene	0.188	0.010	1	0.174	0	108	91	113	0				
m,p-Xylene	0.6763	0.020	1	0.648	0	104	89	116	0				
o-Xylene	0.239	0.010	1	0.252	0	94.8	93	115	0				
Toluene	0.7403	0.010	1	0.778	0	95.2	90	115	0				
Surr: a,a,a-Trifluorotoluene	0.3646	0	1	0.3	0	122	54	126	0				

Sample ID: **0311088-08BMSD** Batch ID: **R22388** Test Code: **SW5030/8015M/8021B** Prep Date: **11/21/2003** Units: **mg/Kg**
Client ID: **N6-10.0** Run ID: **GC7A_031121B** Analysis Date: **11/21/2003** Notes:

Analyte	Result	PQL	DF	Spike Value	Spike Ref Val	%REC	%REC Limits		RPD Ref Val	RPD	RPD Limit	Qual	Note
TPH (Gasoline C6-C12)	10.2	1.0	1	11	0.955	84	68	111	9.94	2.58	25		
Benzene	0.1533	0.010	1	0.162	0	94.6	88	117	0.153	0.196	25		
Ethylbenzene	0.1866	0.010	1	0.174	0	107	91	113	0.188	0.747	25		
m,p-Xylene	0.6672	0.020	1	0.648	0	103	89	116	0.6763	1.35	25		
o-Xylene	0.2346	0.010	1	0.252	0	93.1	93	115	0.239	1.86	25		
Toluene	0.73	0.010	1	0.778	0	93.8	90	115	0.7403	1.4	25		
Surr: a,a,a-Trifluorotoluene	0.312	0	1	0.3	0	104	54	126	0	0	0		

Sample ID: **0311088-01AMS** Batch ID: **8413** Test Code: **SW6010B** Prep Date: **11/21/2003** Units: **mg/Kg**
Client ID: **N9-3.0** Run ID: **ICP1_031121A** Analysis Date: **11/21/2003** Notes:

Analyte	Result	PQL	DF	Spike Value	Spike Ref Val	%REC	%REC Limits		RPD Ref Val	RPD	RPD Limit	Qual	Note
Arsenic	72.17	5.0	1	100	1.21	71	80	120	0			S	Q02
Cadmium	59.16	2.0	1	100	0.6991	58.5	80	120	0			S	Q02
Chromium	96.84	5.0	1	100	47.99	48.9	80	120	0			S	Q02
Lead	61.9	20	1	100	0.3452	61.6	80	120	0			S	Q02

Qualifiers:

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
%REC - % Recovery
S - Spike Recovery outside established recovery limits
R - RPD outside established recovery limits
DF - Dilution Factor
RPD - Relative Percent Difference

Oceanic Analytical Laboratory, Inc.

Date: *Dec 02, 2003*

Client: Edward K. Noda & Associates
Lab Order: 0311088
Project: Upgrade Electrical System, Phase 1, Hickam AF

QC SUMMARY REPORT

Sample Matrix Spike Duplicate

Sample ID: **0311088-01AMSD** Batch ID: **8413** Test Code: **SW6010B** Prep Date: **11/21/2003** Units: **mg/Kg**
Client ID: **N9-3.0** Run ID: **ICP1_031121A** Analysis Date: **11/21/2003** Notes:

Analyte	Result	PQL	DF	Spike Value	Spike Ref Val	%REC	%REC Limits	RPD Ref Val	RPD	RPD Limit	Qual	Note
Arsenic	81.58	5.0	1	100	1.21	80.4	80 120	72.17	12.2	20		
Cadmium	67.54	2.0	1	100	0.6991	66.8	80 120	59.16	13.2	20	S	Q02
Chromium	117.2	5.0	1	100	47.99	69.2	80 120	96.84	19	20	S	Q02
Lead	70.42	20	1	100	0.3452	70.1	80 120	61.9	12.9	20	S	Q02

Sample ID: **0311088-01AMS** Batch ID: **8367** Test Code: **SW8270C** Prep Date: **11/17/2003** Units: **mg/Kg**
Client ID: **N9-3.0** Run ID: **MSD3_031123A** Analysis Date: **11/24/2003** Notes:

Analyte	Result	PQL	DF	Spike Value	Spike Ref Val	%REC	%REC Limits	RPD Ref Val	RPD	RPD Limit	Qual	Note
Acenaphthene	0.133	0.0067	1	0.167	0.00367	77.4	31 137	0				
Benzo(a)pyrene	0.157	0.0067	1	0.167	0.003	92.2	31 137	0				
Fluoranthene	0.1257	0.0067	1	0.167	0	75.2	31 137	0				
Naphthalene	0.097	0.0067	1	0.167	0	58.1	31 137	0				
Surr: 2-Fluorobiphenyl	0.75	0	1	1.67	0	44.9	30 115	0				
Surr: 4-Terphenyl-d14	0.682	0	1	1.67	0	40.8	18 137	0				A02
Surr: Nitrobenzene-d5	0.6403	0	1	1.67	0	38.3	23 120	0				

Sample ID: **0311088-01AMSD** Batch ID: **8367** Test Code: **SW8270C** Prep Date: **11/17/2003** Units: **mg/Kg**
Client ID: **N9-3.0** Run ID: **MSD3_031124B** Analysis Date: **11/24/2003** Notes:

Analyte	Result	PQL	DF	Spike Value	Spike Ref Val	%REC	%REC Limits	RPD Ref Val	RPD	RPD Limit	Qual	Note
Acenaphthene	0.1167	0.0067	1	0.167	0.00367	67.7	31 137	0.133	13.1	50		
Benzo(a)pyrene	0.1617	0.0067	1	0.167	0.003	95	31 137	0.157	2.93	50		
Fluoranthene	0.1143	0.0067	1	0.167	0	68.5	31 137	0.1257	9.44	50		
Naphthalene	0.04933	0.0067	1	0.167	0	29.5	31 137	0.097	65.1	50	SR	Q14
Surr: 2-Fluorobiphenyl	0.6147	0	1	1.67	0	36.8	30 115	0	0	0		
Surr: 4-Terphenyl-d14	0.6373	0	1	1.67	0	38.2	18 137	0	0	0		
Surr: Nitrobenzene-d5	0.283	0	1	1.67	0	16.9	23 120	0	0	0	S	S04

Sample ID: **0311088-01AMS** Batch ID: **8368** Test Code: **SW8015M** Prep Date: **11/17/2003** Units: **mg/Kg**
Client ID: **N9-3.0** Run ID: **GC2B_031118A** Analysis Date: **11/19/2003** Notes:

Analyte	Result	PQL	DF	Spike Value	Spike Ref Val	%REC	%REC Limits	RPD Ref Val	RPD	RPD Limit	Qual	Note
TPH (Diesel)	24.84	5.0	1	33.3	0	74.6	57 108	0				
Surr: Pentacosane	1.282	0	1	1.67	0	76.8	31 152	0				

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
%REC - % Recovery
S - Spike Recovery outside established recovery limits
R - RPD outside established recovery limits
DF - Dilution Factor
RPD - Relative Percent Difference

Oceanic Analytical Laboratory, Inc.

Date: *Dec 02, 2003*

Client: Edward K. Noda & Associates
Lab Order: 0311088
Project: Upgrade Electrical System, Phase 1, Hickam AF

QC SUMMARY REPORT

Sample Matrix Spike Duplicate

Sample ID: **0311088-01AMSD** Batch ID: **8368** Test Code: **SW8015M** Prep Date: **11/17/2003** Units: **mg/Kg**

Client ID: **N9-3.0** Run ID: **GC2B_031118A** Analysis Date: **11/19/2003** Notes:

Analyte	Result	PQL	DF	Spike Value	Spike Ref Val	%REC	%REC Limits		RPD Ref Val	RPD	RPD Limit	Qual	Note
TPH (Diesel)	25.08	5.0	1	33.3	0	75.3	57	108	24.84	0.94	50		
Surr: Pentacosane	1.253	0	1	1.67	0	75	31	152	0	0	0		

Qualifiers:

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
%REC - % Recovery
S - Spike Recovery outside established recovery limits
R - RPD outside established recovery limits
DF - Dilution Factor
RPD - Relative Percent Difference

Oceanic Analytical Laboratory, Inc.

Date: *Dec 02, 2003*

Client: Edward K. Noda & Associates
Lab Order: 0311088
Project: Upgrade Electrical System, Phase 1, Hickam AF

QC SUMMARY REPORT

Laboratory Control Spike - generic

Sample ID: **LCS-8440** Batch ID: **8440** Test Code: **SW1311/7470** Prep Date: **11/25/2003** Units: **mg/L**
Client ID: Run ID: **MERC_031125B** Analysis Date: **11/25/2003** Notes:

Analyte	Result	PQL	DF	Spike Value	Spike Ref Val	%REC	%REC Limits	RPD Ref Val	RPD	RPD Limit	Qual	Note
Mercury	0.00975	0.0025	1	0.01	0	97.5	80 120	0				

Sample ID: **LCS-8417** Batch ID: **8417** Test Code: **SW1311/6010B** Prep Date: **11/21/2003** Units: **mg/L**
Client ID: Run ID: **ICP1_031121D** Analysis Date: **11/21/2003** Notes:

Analyte	Result	PQL	DF	Spike Value	Spike Ref Val	%REC	%REC Limits	RPD Ref Val	RPD	RPD Limit	Qual	Note
Arsenic	1.094	0.50	1	1	0	109	80 120	0				
Barium	1.125	1.0	1	1	0.06592	106	80 120	0				
Cadmium	1.062	0.050	1	1	0	106	80 120	0			*	
Chromium	1.044	0.10	1	1	0	104	80 120	0				
Lead	1.057	0.20	1	1	0.01696	104	80 120	0				
Selenium	1.086	0.50	1	1	0	109	80 120	0			*	
Silver	1.066	0.20	1	1	0	107	80 120	0				

Sample ID: **LCS-8449** Batch ID: **8449** Test Code: **SW1311/6010B** Prep Date: **11/26/2003** Units: **mg/L**
Client ID: Run ID: **ICP1_031126A** Analysis Date: **11/26/2003** Notes:

Analyte	Result	PQL	DF	Spike Value	Spike Ref Val	%REC	%REC Limits	RPD Ref Val	RPD	RPD Limit	Qual	Note
Arsenic	1.079	0.50	1	1	0	108	80 120	0				
Barium	1.12	1.0	1	1	0.05476	107	80 120	0				
Cadmium	1.057	0.050	1	1	0	106	80 120	0			*	
Chromium	1.042	0.10	1	1	0	104	80 120	0				
Lead	1.056	0.20	1	1	0.01834	104	80 120	0				
Selenium	1.07	0.50	1	1	0	107	80 120	0			*	
Silver	1.057	0.20	1	1	0	106	80 120	0				

Sample ID: **LCS-8378** Batch ID: **8378** Test Code: **SW8082** Prep Date: **11/18/2003** Units: **mg/Kg**
Client ID: Run ID: **GC1A_031119A** Analysis Date: **11/19/2003** Notes:

Analyte	Result	PQL	DF	Spike Value	Spike Ref Val	%REC	%REC Limits	RPD Ref Val	RPD	RPD Limit	Qual	Note
Aroclor 1016	0.1721	0.033	1	0.167	0	103	65 128	0				
Aroclor 1260	0.1749	0.033	1	0.167	0	105	63 130	0				
Surr: Decachlorobiphenyl	0.04292	0	1	0.03333	0	129	24 154	0				A01

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
%REC - % Recovery
S - Spike Recovery outside established recovery limits
R - RPD outside established recovery limits
DF - Dilution Factor
RPD - Relative Percent Difference

Oceanic Analytical Laboratory, Inc.

Date: *Dec 02, 2003*

Client: Edward K. Noda & Associates
Lab Order: 0311088
Project: Upgrade Electrical System, Phase 1, Hickam AF

QC SUMMARY REPORT

Laboratory Control Spike - generic

Sample ID: **LCS-8408** Batch ID: **8408** Test Code: **SW8082** Prep Date: **11/21/2003** Units: **mg/Kg**
Client ID: Run ID: **GC6A_031121A** Analysis Date: **11/21/2003** Notes:

Analyte	Result	PQL	DF	Spike Value	Spike Ref Val	%REC	%REC Limits		RPD Ref Val	RPD	RPD Limit	Qual	Note
Aroclor 1016	0.1615	0.033	1	0.167	0	96.7	65	128	0				
Aroclor 1260	0.1686	0.033	1	0.167	0	101	63	130	0				
Surr: Decachlorobiphenyl	0.04124	0	1	0.03333	0	124	24	154	0				

Sample ID: **LCSs112003** Batch ID: **R22373** Test Code: **SW8260B** Prep Date: **11/20/2003** Units: **mg/Kg**
Client ID: Run ID: **MSD1_031120A** Analysis Date: **11/20/2003** Notes:

Analyte	Result	PQL	DF	Spike Value	Spike Ref Val	%REC	%REC Limits		RPD Ref Val	RPD	RPD Limit	Qual	Note
1,1-Dichloroethene	0.0927	0.010	1	0.1	0	92.7	56	145	0				
Benzene	0.09422	0.010	1	0.1	0	94.2	66	124	0				
Chlorobenzene	0.0958	0.010	1	0.1	0	95.8	73	119	0				
Methyl tert-butyl ether	0.2082	0.0050	1	0.2	0	104	58	131	0				
Toluene	0.09112	0.010	1	0.1	0	91.1	74	116	0				
Trichloroethene	0.09562	0.010	1	0.1	0	95.6	78	127	0				
Surr: 1,2-Dichloroethane-d4	0.0988	0	1	0.1	0	98.8	58	180	0				
Surr: 4-Bromofluorobenzene	0.09714	0	1	0.1	0	97.1	69	173	0				
Surr: Dibromofluoromethane	0.09422	0	1	0.1	0	94.2	71	142	0				
Surr: Toluene-d8	0.09872	0	1	0.1	0	98.7	87	126	0				

Sample ID: **LCSDs112003** Batch ID: **R22373** Test Code: **SW8260B** Prep Date: **11/20/2003** Units: **mg/Kg**
Client ID: Run ID: **MSD1_031120A** Analysis Date: **11/20/2003** Notes:

Analyte	Result	PQL	DF	Spike Value	Spike Ref Val	%REC	%REC Limits		RPD Ref Val	RPD	RPD Limit	Qual	Note
1,1-Dichloroethene	0.07942	0.010	1	0.1	0	79.4	56	145	0.0927	15.4	25		
Benzene	0.0893	0.010	1	0.1	0	89.3	66	124	0.09422	5.36	25		
Chlorobenzene	0.09254	0.010	1	0.1	0	92.5	73	119	0.0958	3.46	25		
Methyl tert-butyl ether	0.1756	0.0050	1	0.2	0	87.8	58	131	0.2082	17	25		
Toluene	0.08834	0.010	1	0.1	0	88.3	74	116	0.09112	3.1	25		
Trichloroethene	0.08792	0.010	1	0.1	0	87.9	78	127	0.09562	8.39	25		
Surr: 1,2-Dichloroethane-d4	0.08916	0	1	0.1	0	89.2	58	180	0	0	0		
Surr: 4-Bromofluorobenzene	0.09216	0	1	0.1	0	92.2	69	173	0	0	0		
Surr: Dibromofluoromethane	0.09196	0	1	0.1	0	92	71	142	0	0	0		
Surr: Toluene-d8	0.09942	0	1	0.1	0	99.4	87	126	0	0	0		

Qualifiers:

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
%REC - % Recovery
S - Spike Recovery outside established recovery limits
R - RPD outside established recovery limits
DF - Dilution Factor
RPD - Relative Percent Difference

Oceanic Analytical Laboratory, Inc.

Date: *Dec 02, 2003*

Client: Edward K. Noda & Associates
Lab Order: 0311088
Project: Upgrade Electrical System, Phase 1, Hickam AF

QC SUMMARY REPORT

Laboratory Control Spike - generic

Sample ID: **LCSs112103** Batch ID: **R22378** Test Code: **SW8260B** Prep Date: **11/21/2003** Units: **mg/Kg**
Client ID: Run ID: **MSD1_031121A** Analysis Date: **11/21/2003** Notes:

Analyte	Result	PQL	DF	Spike Value	Spike Ref Val	%REC	%REC Limits		RPD Ref Val	RPD	RPD Limit	Qual	Note
1,1-Dichloroethene	0.09152	0.010	1	0.1	0	91.5	56	145	0				
Benzene	0.09454	0.010	1	0.1	0	94.5	66	124	0				
Chlorobenzene	0.1045	0.010	1	0.1	0	104	73	119	0				
Methyl tert-butyl ether	0.1838	0.0050	1	0.2	0	91.9	58	131	0				
Toluene	0.09498	0.010	1	0.1	0	95	74	116	0				
Trichloroethene	0.09316	0.010	1	0.1	0	93.2	78	127	0				
Surr: 1,2-Dichloroethane-d4	0.09406	0	1	0.1	0	94.1	58	180	0				
Surr: 4-Bromofluorobenzene	0.0968	0	1	0.1	0	96.8	69	173	0				
Surr: Dibromofluoromethane	0.09626	0	1	0.1	0	96.3	71	142	0				
Surr: Toluene-d8	0.1085	0	1	0.1	0	109	87	126	0				

Sample ID: **LCSDs112103** Batch ID: **R22378** Test Code: **SW8260B** Prep Date: **11/21/2003** Units: **mg/Kg**
Client ID: Run ID: **MSD1_031121A** Analysis Date: **11/21/2003** Notes:

Analyte	Result	PQL	DF	Spike Value	Spike Ref Val	%REC	%REC Limits		RPD Ref Val	RPD	RPD Limit	Qual	Note
1,1-Dichloroethene	0.08486	0.010	1	0.1	0	84.9	56	145	0.09152	7.55	25		
Benzene	0.08622	0.010	1	0.1	0	86.2	66	124	0.09454	9.21	25		
Chlorobenzene	0.08482	0.010	1	0.1	0	84.8	73	119	0.1045	20.8	25		
Methyl tert-butyl ether	0.168	0.0050	1	0.2	0	84	58	131	0.1838	9	25		
Toluene	0.08412	0.010	1	0.1	0	84.1	74	116	0.09498	12.1	25		
Trichloroethene	0.08482	0.010	1	0.1	0	84.8	78	127	0.09316	9.37	25		
Surr: 1,2-Dichloroethane-d4	0.09402	0	1	0.1	0	94	58	180	0	0	0		
Surr: 4-Bromofluorobenzene	0.1014	0	1	0.1	0	101	69	173	0	0	0		
Surr: Dibromofluoromethane	0.09532	0	1	0.1	0	95.3	71	142	0	0	0		
Surr: Toluene-d8	0.0986	0	1	0.1	0	98.6	87	126	0	0	0		

Qualifiers:

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
%REC - % Recovery
S - Spike Recovery outside established recovery limits
R - RPD outside established recovery limits
DF - Dilution Factor
RPD - Relative Percent Difference

Oceanic Analytical Laboratory, Inc.

Date: *Dec 02, 2003*

Client: Edward K. Noda & Associates
Lab Order: 0311088
Project: Upgrade Electrical System, Phase 1, Hickam AF

QC SUMMARY REPORT

Laboratory Control Spike - generic

Sample ID: **LCS112003GBTEX** Batch ID: **R22368** Test Code: **SW5030/8015M/8021B** Prep Date: **11/20/2003** Units: **mg/Kg**
Client ID: Run ID: **GC4A_031120B** Analysis Date: **11/20/2003** Notes:

Analyte	Result	PQL	DF	Spike Value	Spike Ref Val	%REC	%REC Limits	RPD Ref Val	RPD	RPD Limit	Qual	Note
TPH (Gasoline C6-C12)	2.22	0.20	1	2.2	0.1152	95.7	68 111	0				
Benzene	0.05196	0.0020	1	0.0324	0	160	88 117	0			S	Q01
Ethylbenzene	0.0399	0.0020	1	0.0348	0	115	91 113	0			S	Q01
m,p-Xylene	0.1285	0.0040	1	0.1296	0	99.2	89 116	0				
o-Xylene	0.05784	0.0020	1	0.0504	0	115	93 115	0				
Toluene	0.1555	0.0020	1	0.1556	0	99.9	90 115	0				
Surr: a,a,a-Trifluorotoluene	0.06202	0	1	0.06	0	103	54 126	0				

Sample ID: **LCSD112003GBT** Batch ID: **R22368** Test Code: **SW5030/8015M/8021B** Prep Date: **11/20/2003** Units: **mg/Kg**
Client ID: Run ID: **GC4A_031120B** Analysis Date: **11/20/2003** Notes:

Analyte	Result	PQL	DF	Spike Value	Spike Ref Val	%REC	%REC Limits	RPD Ref Val	RPD	RPD Limit	Qual	Note
TPH (Gasoline C6-C12)	2.2	0.20	1	2.2	0.1152	94.8	68 111	2.22	0.905	25		
Benzene	0.05176	0.0020	1	0.0324	0	160	88 117	0.05196	0.386	25	S	Q01
Ethylbenzene	0.03974	0.0020	1	0.0348	0	114	91 113	0.0399	0.402	25	S	Q01
m,p-Xylene	0.1276	0.0040	1	0.1296	0	98.4	89 116	0.1285	0.719	25		
o-Xylene	0.05744	0.0020	1	0.0504	0	114	93 115	0.05784	0.694	25		
Toluene	0.1552	0.0020	1	0.1556	0	99.7	90 115	0.1555	0.206	25		
Surr: a,a,a-Trifluorotoluene	0.06172	0	1	0.06	0	103	54 126	0	0	0		

Sample ID: **LCS112103GBTEX** Batch ID: **R22388** Test Code: **SW5030/8015M/8021B** Prep Date: **11/21/2003** Units: **mg/Kg**
Client ID: Run ID: **GC7A_031121B** Analysis Date: **11/21/2003** Notes:

Analyte	Result	PQL	DF	Spike Value	Spike Ref Val	%REC	%REC Limits	RPD Ref Val	RPD	RPD Limit	Qual	Note
TPH (Gasoline C6-C12)	11.1	1.0	1	11	0.548	95.9	68 111	0				
Benzene	0.1676	0.010	1	0.162	0.00084	103	88 117	0				
Ethylbenzene	0.2028	0.010	1	0.174	0.00129	116	91 113	0			S	Q01
m,p-Xylene	0.7155	0.020	1	0.648	0.00339	110	89 116	0				
o-Xylene	0.252	0.010	1	0.252	0.00117	99.5	93 115	0				
Toluene	0.7648	0.010	1	0.778	0.00127	98.1	90 115	0				
Surr: a,a,a-Trifluorotoluene	0.305	0	1	0.3	0	102	54 126	0				

Qualifiers:

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
%REC - % Recovery
S - Spike Recovery outside established recovery limits
R - RPD outside established recovery limits
DF - Dilution Factor
RPD - Relative Percent Difference

Oceanic Analytical Laboratory, Inc. **Date:** *Dec 02, 2003*

Client: Edward K. Noda & Associates
Lab Order: 0311088
Project: Upgrade Electrical System, Phase 1, Hickam AF

QC SUMMARY REPORT

Laboratory Control Spike Duplicate

Sample ID: **LCSD112103GBT** Batch ID: **R22388** Test Code: **SW5030/8015M/8021B** Prep Date: **11/21/2003** Units: **mg/Kg**
Client ID: Run ID: **GC7A_031121B** Analysis Date: **11/21/2003** Notes:

Analyte	Result	PQL	DF	Spike Value	Spike Ref Val	%REC	%REC Limits	RPD Ref Val	RPD	RPD Limit	Qual	Note
TPH (Gasoline C6-C12)	11	1.0	1	11	0.548	95	68 111	11.1	0.905	25		
Benzene	0.1598	0.010	1	0.162	0.00084	98.1	88 117	0.1676	4.76	25		
Ethylbenzene	0.196	0.010	1	0.174	0.00129	112	91 113	0.2028	3.41	25		
m,p-Xylene	0.6993	0.020	1	0.648	0.00339	107	89 116	0.7155	2.29	25		
o-Xylene	0.2442	0.010	1	0.252	0.00117	96.4	93 115	0.252	3.14	25		
Toluene	0.7591	0.010	1	0.778	0.00127	97.4	90 115	0.7648	0.748	25		
Surr: a,a,a-Trifluorotoluene	0.3329	0	1	0.3	0	111	54 126	0	0	0		

Sample ID: **LCS112503GBTEX** Batch ID: **R22442** Test Code: **SW5030/8015M/8021B** Prep Date: **11/25/2003** Units: **mg/Kg**
Client ID: Run ID: **GC7A_031125A** Analysis Date: **11/25/2003** Notes:

Analyte	Result	PQL	DF	Spike Value	Spike Ref Val	%REC	%REC Limits	RPD Ref Val	RPD	RPD Limit	Qual	Note
TPH (Gasoline C6-C12)	10.3	1.0	1	11	0.615	88	68 111	0				
Benzene	0.143	0.010	1	0.162	0	88.3	88 117	0				
Ethylbenzene	0.1802	0.010	1	0.174	0	104	91 113	0				
m,p-Xylene	0.6422	0.020	1	0.648	0	99.1	89 116	0				
o-Xylene	0.225	0.010	1	0.252	0	89.3	93 115	0			S	Q01
Toluene	0.6919	0.010	1	0.778	0	88.9	90 115	0			S	Q01
Surr: a,a,a-Trifluorotoluene	0.3098	0	1	0.3	0	103	54 126	0				

Sample ID: **LCSD112503GBT** Batch ID: **R22442** Test Code: **SW5030/8015M/8021B** Prep Date: **11/25/2003** Units: **mg/Kg**
Client ID: Run ID: **GC7A_031125A** Analysis Date: **11/25/2003** Notes:

Analyte	Result	PQL	DF	Spike Value	Spike Ref Val	%REC	%REC Limits	RPD Ref Val	RPD	RPD Limit	Qual	Note
TPH (Gasoline C6-C12)	10.3	1.0	1	11	0.615	88	68 111	10.3	0	25		
Benzene	0.1414	0.010	1	0.162	0	87.3	88 117	0.143	1.13	25	S	Q01
Ethylbenzene	0.1794	0.010	1	0.174	0	103	91 113	0.1802	0.445	25		
m,p-Xylene	0.6408	0.020	1	0.648	0	98.9	89 116	0.6422	0.218	25		
o-Xylene	0.2245	0.010	1	0.252	0	89.1	93 115	0.225	0.222	25	S	Q01
Toluene	0.6976	0.010	1	0.778	0	89.7	90 115	0.6919	0.82	25	S	Q01
Surr: a,a,a-Trifluorotoluene	0.3427	0	1	0.3	0	114	54 126	0	0	0		

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
%REC - % Recovery
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R - RPD outside established recovery limits
DF - Dilution Factor
RPD - Relative Percent Difference

Oceanic Analytical Laboratory, Inc. **Date:** *Dec 02, 2003*

Client: Edward K. Noda & Associates
Lab Order: 0311088
Project: Upgrade Electrical System, Phase 1, Hickam AF

QC SUMMARY REPORT

Laboratory Control Spike - generic

Sample ID: **LCS-8413** Batch ID: **8413** Test Code: **SW6010B** Prep Date: **11/21/2003** Units: **mg/Kg**
Client ID: Run ID: **ICP1_031121A** Analysis Date: **11/21/2003** Notes:

Analyte	Result	PQL	DF	Spike Value	Spike Ref Val	%REC	%REC Limits		RPD Ref Val	RPD	RPD Limit	Qual	Note
Arsenic	94.64	5.0	1	100	0	94.6	80	120	0				
Cadmium	92.5	2.0	1	100	0	92.5	80	120	0				
Chromium	91.72	5.0	1	100	0	91.7	80	120	0				
Lead	92.44	20	1	100	0.2393	92.2	80	120	0				

Sample ID: **LCS-8367** Batch ID: **8367** Test Code: **SW8270C** Prep Date: **11/17/2003** Units: **mg/Kg**
Client ID: Run ID: **MSD3_031123A** Analysis Date: **11/23/2003** Notes:

Analyte	Result	PQL	DF	Spike Value	Spike Ref Val	%REC	%REC Limits		RPD Ref Val	RPD	RPD Limit	Qual	Note
Acenaphthene	0.1077	0.0067	1	0.167	0.00367	62.3	38	107	0				
Benzo(a)pyrene	0.1403	0.0067	1	0.167	0.003	82.2	45	100	0				
Fluoranthene	0.139	0.0067	1	0.167	0	83.2	45	107	0				
Naphthalene	0.09433	0.0067	1	0.167	0	56.5	31	104	0				
Surr: 2-Fluorobiphenyl	0.7003	0	1	1.67	0	41.9	30	115	0				
Surr: 4-Terphenyl-d14	0.805	0	1	1.67	0	48.2	18	137	0				
Surr: Nitrobenzene-d5	0.6677	0	1	1.67	0	40	23	120	0				

Sample ID: **LCS-8368** Batch ID: **8368** Test Code: **SW8015M** Prep Date: **11/17/2003** Units: **mg/Kg**
Client ID: Run ID: **GC2B_031118A** Analysis Date: **11/18/2003** Notes:

Analyte	Result	PQL	DF	Spike Value	Spike Ref Val	%REC	%REC Limits		RPD Ref Val	RPD	RPD Limit	Qual	Note
TPH (Diesel)	24.02	5.0	1	33.3	0	72.1	57	108	0				
Surr: Pentacosane	1.249	0	1	1.67	0	74.8	31	152	0				

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
B - Analyte detected in the associated Method Blank
%REC - % Recovery
S - Spike Recovery outside established recovery limits
R - RPD outside established recovery limits
DF - Dilution Factor
RPD - Relative Percent Difference

SAMPLE CHAIN OF CUSTODY RECORD

Edward K. Noda and Associates, Inc.
615 Piikoi Street, Suite 300, Honolulu, Hawaii 96814
Telephone: (808) 591-8553 Facsimile: (808) 593-8551

Laboratory I.D. Number: 0311083

Project Manager / Contact: D. Fraim

Samples Collected by: D. Fraim

EKNA Job Name: Upgrade Electrical System, Phase 1, Hickam AFB

EKNA Job Number: 2396-01F

Sample Turnaround Time	Total Number of Samples in Shipment
Standard - 10 Working Days	

UST ☐ NPDES ☐ NOI ☐ DRINKING PCB ☐ OTHER ☐

QC LEVEL ☐ A ☐ B ☐ C ☐ D

Laboratory Analyses Requested: (1) TPH - Fuel Fingerprint (8015M); (2) TPH - Gas (8015M); (3) TPH - Diesel (8015M); (4) TPH - Jet Fuel (8015M); (5) BTEX (8021B); (6) VOCs (8260B); (7) PAH (8270C); (8) Total Metals - As, Cd, Cr, Pb (6010); (9) TCLP RCRA 8 Metals (1311/6010); (10) Total PCB (8082)

Sample Number	Grab or Comp	Date Collected	Time Collected	Sample Matrix	No. of Containers	TPH - Fuel Fingerprint (8015M)	TPH - Gas (8015M)	TPH - Diesel (8015M)	TPH - Jet Fuel (8015M)	BTEX (8021B)	VOCs (8260B)	PAH (8270C)	Total Metals - As, Cd, Cr, Pb (6010)	TCLP RCRA 8 Metals (1311/6010)	Total PCB (8082)	Laboratory Sample #	Container Type	PID Reading (ppm)
N9-3.0	GRAB	11/11/03	0850	Soil	1	X	X	X	X	X	X	X	X	X	X	-01	6" Tube	15.0
N9-10.0	GRAB	"	0910			X	X	X	X	X	X	X	X	X	X	-02		213.1
N8-3.0	"	"	1000	"		X	X	X	X	X	X	X	X	X	X	-03		NA
N8-10.0	"	"	1020	"		X	X	X	X	X	X	X	X	X	X	-04		
N7-2.0	"	"	1110	"		X	X	X	X	X	X	X	X	X	X	-05		
N7-10.0	"	"	1125	"		X	X	X	X	X	X	X	X	X	X	-06		
N6-3.0	"	"	1151	"		X	X	X	X	X	X	X	X	X	X	-07		
N6-10.0	"	"	1306	"		X	X	X	X	X	X	X	X	X	X	-08		
N5-2.0	"	"	1404	"		X	X	X	X	X	X	X	X	X	X	-09		
N5-6.0	"	"	1412	"		X	X	X	X	X	X	X	X	X	X	-10		

Relinquished by (Name & Signature)	Company	Date	Time	Received by (Name & Signature)	Company	Date	Time
1. D. Fraim	EKNA			2. [illegible]	OTC	11/12/03	1425
3.				4. Intact 40°F @ Noda		No Ice	
5.				6.			

Comments:

Dispose Samples	XX
Return Samples	

SAMPLE CHAIN OF CUSTODY RECORD

Edward K. Noda and Associates, Inc.
615 Piikoi Street, Suite 300, Honolulu, Hawaii 96814
Telephone: (808) 591-8553 Facsimile: (808) 593-8551

Laboratory I.D. Number: 0311088

Project Manager / Contact: D. Fraim

Samples Collected by: D. Fraim

EKNA Job Name: Upgrade Electrical System, Phase 1, Hickam AFB

EKNA Job Number: 2396-01F

Sample Turnaround Time: Standard - 10 Working Days

Total Number of Samples in Shipment:

UST ☐ NPDES ☐ NOI ☐ DRINKING PCB ☐ OTHER ☐

QC LEVEL ☐ A ☐ B ☐ C ☐ D

Sample Number	Grab or Comp	Date Collected	Time Collected	Sample Matrix	No. of Containers	TPH - Fuel Fingerprint (8015M)	TPH - Gas (8015M)	TPH - Diesel (8015M)	TPH - Jet Fuel (8015M)	BTEX (8021B)	VOCs (8260B)	PAH (8270C)	Total Metals - As, Cd, Cr, Pb (6010)	TCLP RCRA 8 Metals (1311/6010)	Total PCB (8082)	Laboratory Sample #	Container Type	PID Reading (ppm)
N4-3.0	Grab	11/11/03	1503	Soil	1	X	X	X	X	X	X	X	X	X	X	-11	6" Tube	
N4-8.0 (*)	"	"	1510	"	1	X	X	X	X	X	X	X	X	X	X	-12		
N3-3.0	"	"	1545	"	1	X	X	X	X	X	X	X	X	X	X	-13		
N3-5.0	"	"	1552	"	1	X	X	X	X	X	X	X	X	X	X	-14		

	Relinquished by (Name & Signature)	Company	Date	Time		Received by (Name & Signature)	Company	Date	Time
1.	D. Fraim	EKNA			2.	[illegible]	ATL	11/12/03	1425
3.					4.	Received 40°F @	Noda	No Ice	
5.					6.				

Comments: (*) SAMPLE IS SLUDGY. OPEN CAREFULLY AS MARKED. HAS ~~JET~~ FUEL ODOR

Dispose Samples: XX

Return Samples: